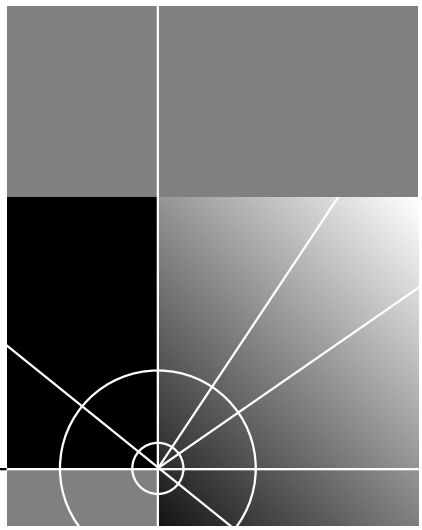
Installing the SuperStack® II NETBuilder® Token Ring and FRAD Bridge/Router

Models 32x and 52x



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Classes
Various national agencies (in the United States, The Federal Communications Commission (FCC)) govern the levels of electromagnetic emissions from digital devices. Electromagnetic emissions can interfere with radio and television transmission. To reduce the risk of harmful interference these agencies have established requirements for manufacturers of digital devices

The manufacturer of a digital device must test and label a product to inform an end-user of the maximum emission level from the product when used in accordance with its instructions. The emission levels encountered are classified as Class A or Class B. A system that meets the Class A requirement can be marketed for use in an industrial or a commercial area. A system that meets the more stringent Class B requirement can be marketed for use in a residential area in addition to an industrial or a commercial area.

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Modifications
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Federal Communications Commission Notice
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can create radio frequency energy and, if not installed and used inaccordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area can cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Notice
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Avis Canadien
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Type Approval Information
This apparatus has been approved for use for connection to the following public telecommunication services: ISDN basic access, X.25 (V.24, V.36, and X.21), X.21 leased lines, X.21bis leased lines (V.24 and V.36). Any other usage will invalidate the approval of the apparatus if as a result it then ceases to conform against the standards against which approval was granted.

Notice
The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the users' satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the inside wiring associated with a single line individual service may be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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- **EN 55022** — Limits and methods of measurement of radio interference characteristics of information technology equipment.
- **EN 50082-1** — Electromagnetic compatibility – generic immunity standard part 1: residential, commercial, and light industrial.
- **I-CTR2** — For connection to X.25 packet switched services and X.21 leased lines.
- **I-CTR3** — For models with ISDN interfaces: connection to basic rate ISDN services.

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ABOUT THIS GUIDE

This guide includes complete hardware installation and cabling information for your SuperStack® II NETBuilder® bridge/router model 32x or 52x.

This guide is for the following audience:

- Inexperienced end users configuring their first internetworking device
- Experienced network administrators who are configuring the central node as well as the peripheral node (boundary router)
- Experienced system integrators

If the information in the release notes shipped with your product differs from the information in this guide, follow the release notes.

Conventions

Table 1 provides a list of notice icons that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Alerts you to...
	Information note	Important features or instructions
	Caution	Risk of personal safety, system damage, or loss of data
	Warning	Risk of severe personal injury

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1 INSTALLING THE HARDWARE

This chapter describes how to install your SuperStack II NETBuilder bridge/router.

Required Equipment

Table 1-1 lists the items you receive in the shipping carton and items you need to provide.

Table 1-1 Equipment Received and Equipment Needed

Shipping carton contents	SuperStack II NETBuilder bridge/router
	Power cable
	Rack-mount kit
	Software CD-ROM* (models 320, 327, and 527 only)
	Documentation and documentation CD-ROM
	NETBuilder Upgrade Utilities CD-ROM (models 320, 327, and 527 only)
What you need to provide	Unshielded twisted pair (UTP) or shielded twisted pair (STP) cable for LAN connection (Models 323, 327, 523, and 527 only)
	Integrated Services Digital Network (ISDN) cable for ISDN connection (Model 52x only)
	A cable (3Com® part number 3C8101) to connect to a SuperStack II Redundant Power System (RPS).
	Terminal, PC, or modem and cable

(continued)

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Table 1-1 Equipment Received and Equipment Needed (continued)

What you need to provide (continued)	*For serial connection, provide the following:* Channel service unit/digital service unit (CSU/DSU) device or modem if desired Up to three of the following cables: X.21 or V.35 adapter cable UNIVERSAL connector to RS-449/V.36 data communications equipment (DCE) cable UNIVERSAL to RS-232 DCE cable UNIVERSAL to V.35 direct connect cable UNIVERSAL to RS-232 direct connect cable UNIVERSAL to RS-449/V.36 direct connect cable RS-232 to RS-232 direct connect cable V.35 to V.35 direct connect cable V.35 to V.35 DCE cable RS-232 to RS-232 DCE cable

* The software is preinstalled in the flash memory drive of the bridge/router and automatically loads when you turn on the power. The software CD-ROM is for software recovery purposes only.

WARNING: *To eliminate cable noise emission in excess of FCC regulations, part 15, subpart J, and EN55022B, all interconnection cables should be equipped with shielded connectors, the backshells of which must completely surround the cable shield.*

For more information on cables, refer to Chapter 2.

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Mounting

You can mount your bridge/router on a tabletop, stack it, or mount it in a rack.

Rack-Mount Kit

The rack-mount kit contains the following hardware:

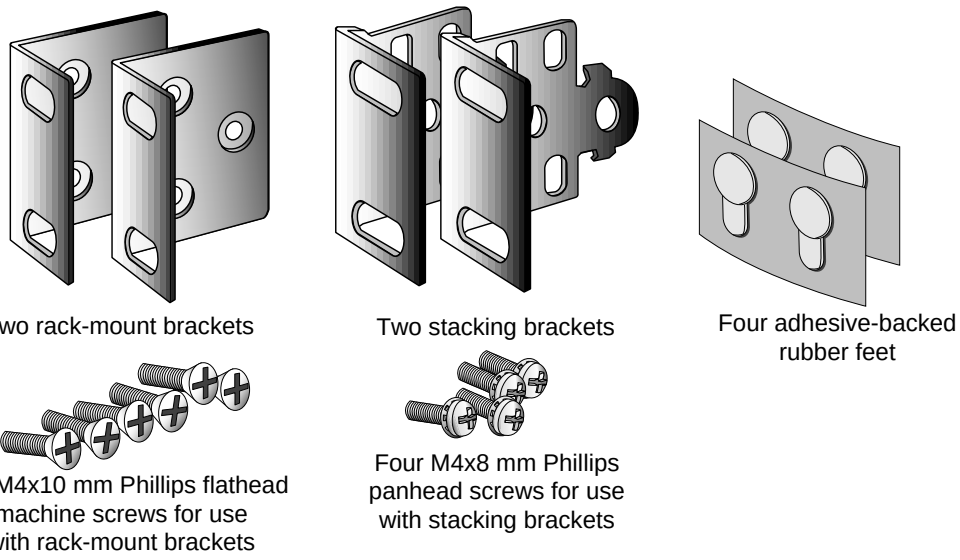
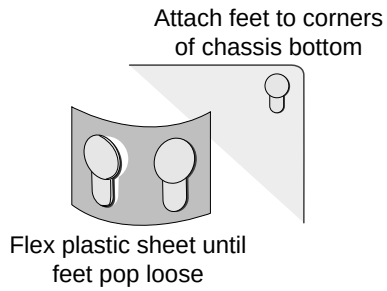

Two rack-mount brackets
Two stacking brackets
Four adhesive-backed rubber feet
Six M4x10 mm Phillips flathead machine screws for use with rack-mount brackets
Four M4x8 mm Phillips panhead screws for use with stacking brackets

Figure 1-1 Rack-Mount Kit Contents

Installing on a Tabletop

If you plan to install your bridge/router on a tabletop, attach the rubber feet as shown.



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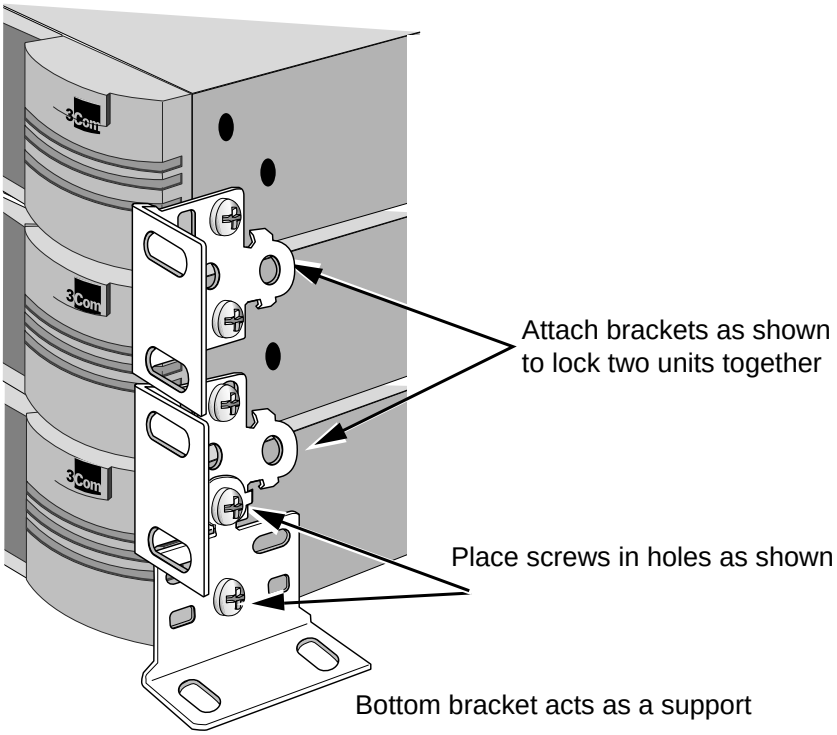
Stacking with Brackets

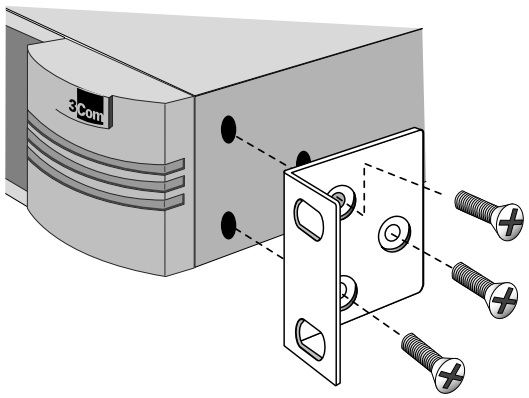
The stacking brackets can be used to securely stack several bridge/routers on a tabletop. Use the stacking brackets and the M4x8 mm panhead stacking screws shown in Figure 1-1.



Installing in a Rack

To install the bridge/router in a rack, use the rack-mount brackets and the M4x10 mm flathead rack-mount screws shown in Figure 1-1 and follow these steps:

1 Secure the rack-mount brackets to each side of the chassis using three flathead screws per bracket.



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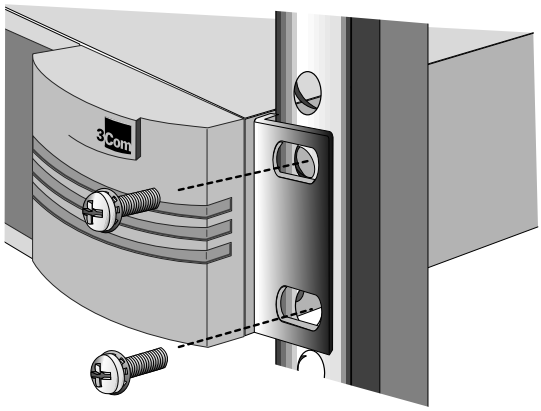
2 Hold the chassis between the poles of the rack and attach the brackets to the rack using panhead screws (you must provide these screws). Tighten each screw securely.



CAUTION: *Using fewer than two screws to secure the brackets to the rack may cause the boundary router to fall and sustain damage not covered by the warranty.*

Cabling the Connectors

This section describes how to cable the LAN, ISDN, and serial connectors on your bridge/router.

If you are planning to connect your SuperStack II bridge/router directly to another SuperStack II system or to a NETBuilder II® bridge/router with an HSS V.35 3-port module installed, you must use a modem eliminator between the two devices. Be sure the default setting of External for the -PATH CLock parameter is maintained on each device. Contact your 3Com supplier for a list of suggested modem eliminators.

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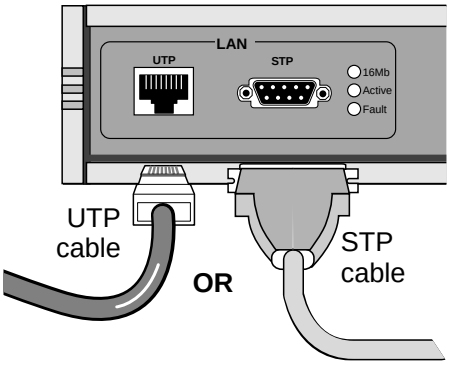
Cabling the LAN Connector (Models 323, 327, and 52x)

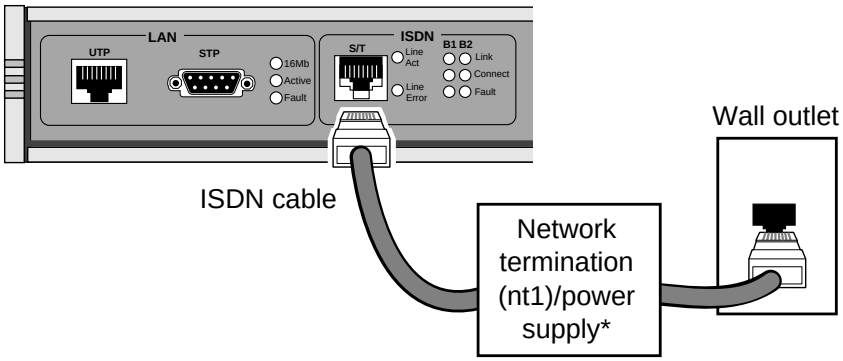
This section applies to models 323, 327, and 52x only. You can use only one type of LAN connector on each bridge/router. The following figure shows how to cable a LAN connector.



For more information on AUI and 10BASE-T cables, refer to Chapter 2.

Cabling the ISDN Connector (Model 52x)

This section applies to model 52x bridge/routers only. The following figure shows how to cable an ISDN connector.



*required for U.S. and Canada only

The NT1 and power supply shown in the figure above must either be leased from the telephone company or purchased from an ISDN equipment vendor in the U.S. and Canada only. In other countries, you do not need to provide this equipment because the function of the equipment is provided by the ISDN switch. For more information about ISDN, refer to Appendix A.

For more information on ISDN cables, refer to Chapter 2.

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Cabling the Serial Connectors

The serial connectors provide the following options:

- The UNIVERSAL connector can be converted to a V.35, V.36, X.21, RS-449, or RS-232 connector.
- All serial connectors can function in either DTE or DCE-like mode, which allows you to connect a serial connector to either a CSU/DSU device or modem (DTE mode), or to an IBM cluster controller (DCE-like mode). A connection to an IBM cluster controller must be made using a permanent leased line only. You can operate the serial connectors in any combination of DTE and DCE-like modes.

The cables you use determine the serial connector function. Table 1-2 lists the types of devices available for serial connections, cable options for connection to each device, and if the cable is sold by 3Com. Cables used for IBM cluster controller connectivity (DCE-like mode) are referred to as *direct connect cables*.

Table 1-2 Serial Connector Cabling Information

Connection to	Connector*	Connector Mode	Cable Name	Sold by 3Com?
V.35 CSU/DSU device or modem	V.35	DTE	V.35 to V.35 DCE cable	No. Easily obtained from cable manufacturer.
V.35 CSU/DSU device or modem	UNIVERSAL	DTE	V.35 adapter cable	Yes (3C8035).
V.35 IBM cluster controller	V.35	DCE-like	V.35 to V.35 direct connect cable	No. See Chapter 2 for pin assignments.
V.35 IBM cluster controller	UNIVERSAL	DCE-like	UNIVERSAL to V.35 direct connect cable	Yes (3C8135).
X.21 CSU/DSU device or modem	UNIVERSAL	DTE	X.21 adapter cable	Yes (3C8021).
RS-449 or V.36 CSU/DSU device or modem	UNIVERSAL	DTE	UNIVERSAL to RS-449/V.36 DCE cable	No. See Chapter 2 for pin assignments.
RS-449 or V.36 IBM cluster controller	UNIVERSAL	DCE-like	UNIVERSAL to RS-449/V.36 direct connect cable	No. See Chapter 2 for pin assignments.
RS-232 CSU/DSU device or modem	UNIVERSAL	DTE	UNIVERSAL to RS-232 DCE cable	Yes (3C8023).
RS-232 CSU/DSU device or modem	RS-232	DTE	RS-232 to RS-232 DCE cable	No. Easily obtained from cable manufacturer.
RS-232 IBM cluster controller	UNIVERSAL	DCE-like	UNIVERSAL to RS-232 direct connect cable	Yes (3C8123).
RS-232 IBM cluster controller	RS-232	DCE-like	RS-232 to RS-232 direct connect cable	Yes (3C8132).

* If you cable the UNIVERSAL connector, you need to perform some software configuration. For more information, refer to the software guide.

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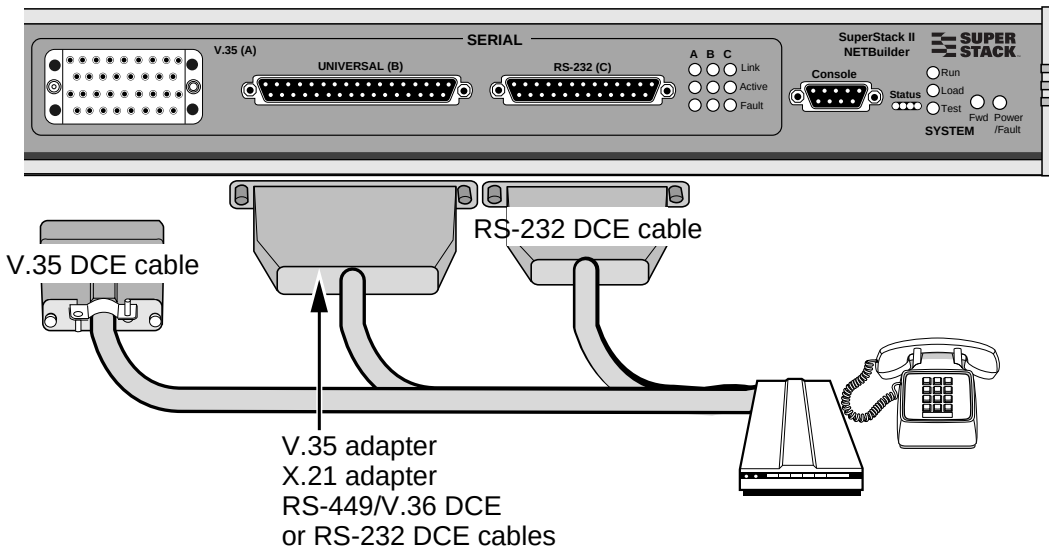
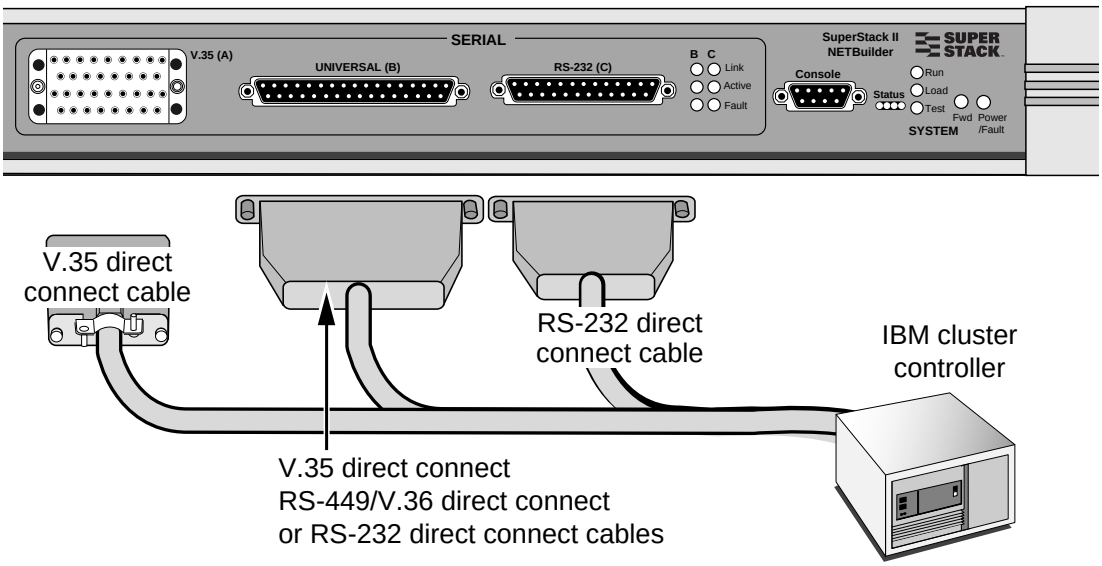
The following figures show how to cable the serial connectors.

Models 32x (DTE mode)



Models 32x (DCE-like mode)



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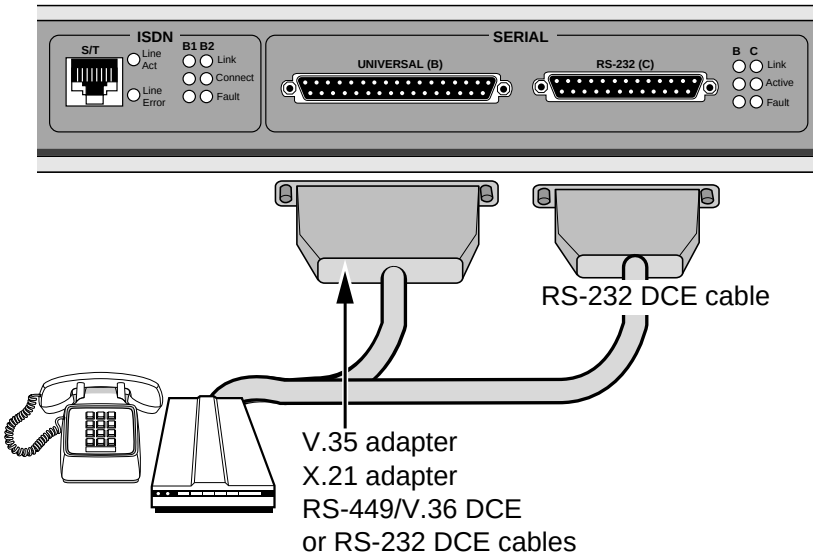
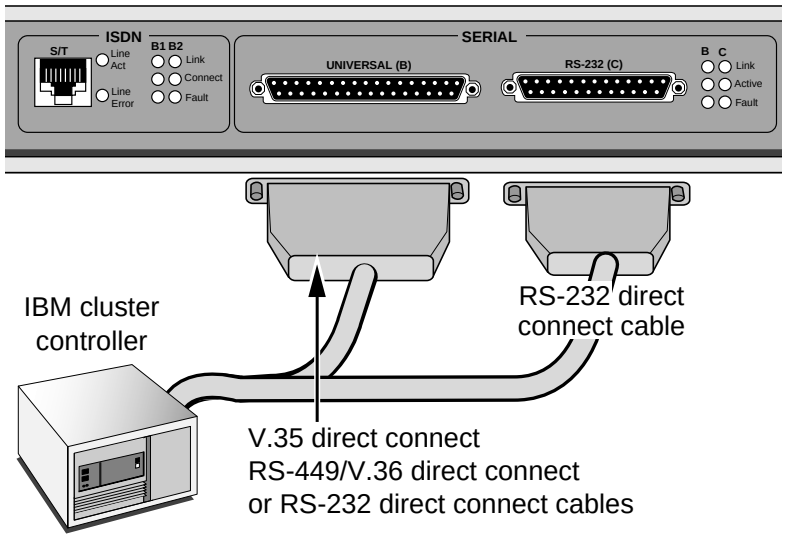
Models 52x (DTE mode)



Models 52x (DCE-like mode)



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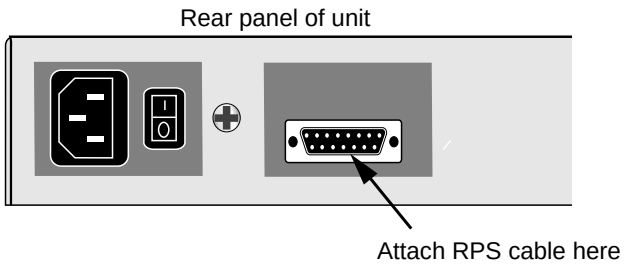
Attaching a Redundant Power System

You can attach your SuperStack II bridge/router to a SuperStack II Redundant Power System (RPS). You will need to order the connecting cable (part number 3C8101) from 3Com. The following figure shows where to attach this cable.



For full power supply redundancy, attach one end of the RPS cable to the rear panel on the bridge/router and the other end to the RPS. Then attach one end of the power cord to the rear panel on the bridge/router and the other end to a power outlet.

In this configuration, the internal supply provides power. If the internal supply fails or is switched off, or if there is a power failure, the RPS is activated and the bridge/router reboots.

To reset a bridge/router in this configuration, turn the power off, wait 5 seconds and turn it back on. The bridge/router switches to the RPS, then switches back to the internal supply to reboot.

CAUTION: *For system susceptibility protection, always leave the AC cord attached to the bridge/router hardware and to a power outlet.*

Internal power supply failure is rare. If it occurs, the power switch on your bridge/router will not operate. To reboot you will need to unplug the RPS cable and then plug it back in. Replace your bridge/router with another bridge/router that has a functioning internal power supply as soon as possible. Contact your 3Com representative to replace your bridge/router.

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Connecting a PC, Terminal, or Modem

Connect a PC running a terminal emulation program, a terminal, or a modem to the Console port on the SuperStack II bridge/router to configure the bridge/router software and review startup and system operation messages.

To connect a PC, terminal, or modem to the DPE module, follow these steps:

1. Obtain a cable to connect the console to the Console port on the bridge/router. See "Console Cables" on page 2-3 for cable pinouts.

   The Console port is a 9-pin male connector.

   For the PC, use a 9-pin female to 9-pin female PC cable. A null modem-type cable may be used.

   For the terminal, use a 9-pin female to 25-pin terminal cable. A null modem-type cable may be used.

   For the modem, use a 9-pin female to 25-pin male modem cable. A straight-through-type cable may be used.

2. Connect one end of the cable to the Console port on the SuperStack II system and the other end to the serial port on the back of your console.

3. Verify that configurable parameters of your console match the configuration settings of the Console port specified in Table 1-3.

Table 1-3 CONSOLE Port Configuration Settings

Characteristic	Setting
Baud rate	9600
Databits	8
Parity	None
Stop bits	1
DTR	Ignored
Duplex	Full
Echo	Off
Flow control	X-on/X-off

4. Turn on the console.

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Shutting Down

If your SuperStack II system is not connected to an RPS, turn off the power by pressing the off (0) side of the power switch on the back panel. If your system is connected to an RPS, turn off the power by unplugging the RPS cable from the system and then pressing the off (0) side of the power switch.

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2 OVERVIEW

This chapter provides an overview of the SuperStack II NETBuilder bridge/router, including information on:

- Model features
- Chassis panels
- LEDs
- DIP switches
- Hardware interrupt switch
- Connectors and cables
- Physical specifications

Model Features

Table 2-1 lists each SuperStack II NETBuilder model along with memory, port, and upgrade information.

Table 2-1 SuperStack II NETBuilder Model Features

Model	Flash Memory	DRAM	LAN Ports	Active WAN Ports	Flash Memory Upgradeable To	DRAM Upgradeable To	Software Upgradeable
320	4 MB	8 MB	None	3 serial	8 MB	12 MB	Yes
323	4 MB	8 MB	1 UTP or STP	1 serial 1 backup serial	8 MB	12 MB	Yes
327	4 MB	8 MB	1 UTP or STP	3 serial	8 MB	12 MB	No
523	4 MB	8 MB	1 UTP or STP	1 ISDN BRI 1 serial	8 MB	12 MB	Yes
527	4 MB	8 MB	1 UTP or STP	1 ISDN BRI 2 serial	8 MB	12 MB	No

Chassis Panels

The following figures show the front and back panels for each chassis.

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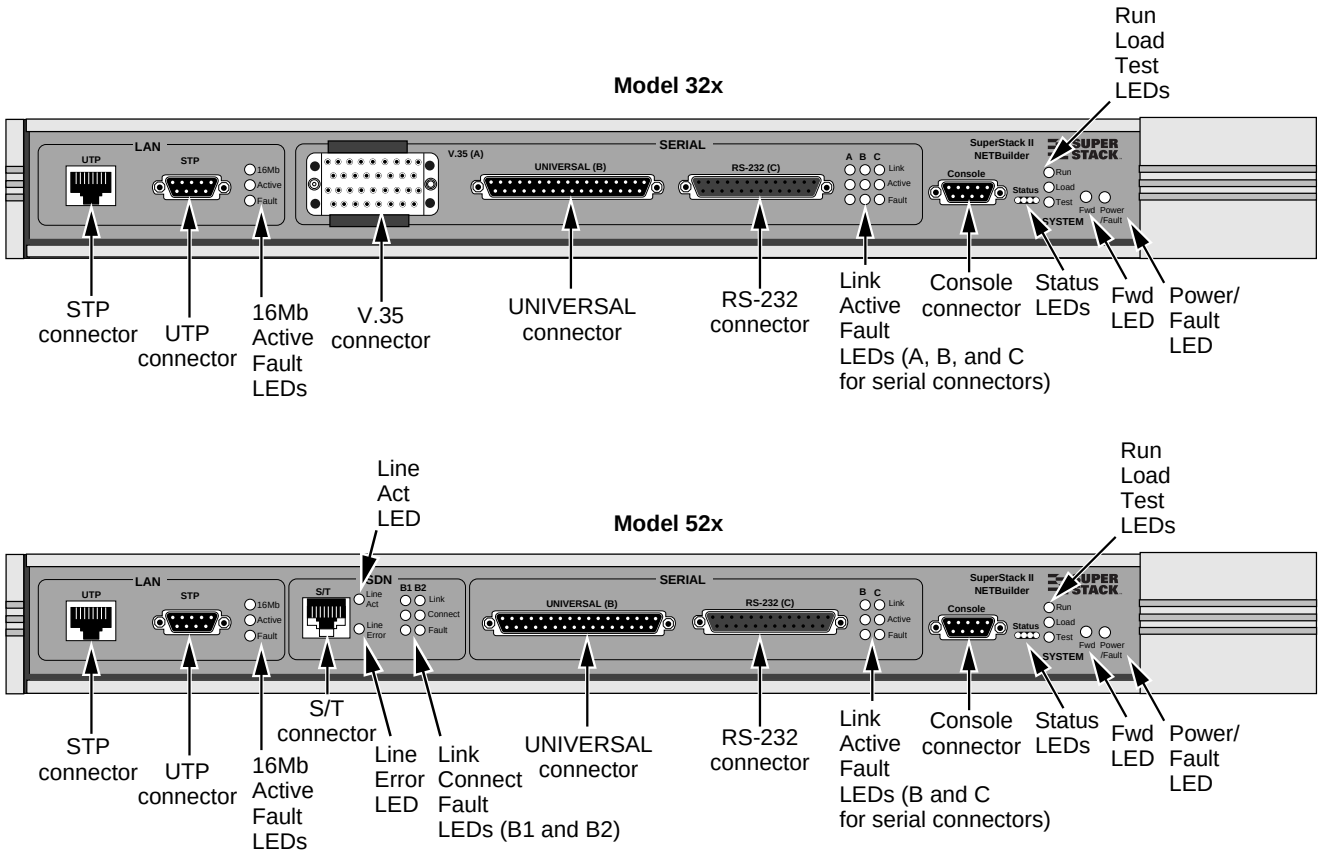

Figure 2-1 Chassis Front Panels

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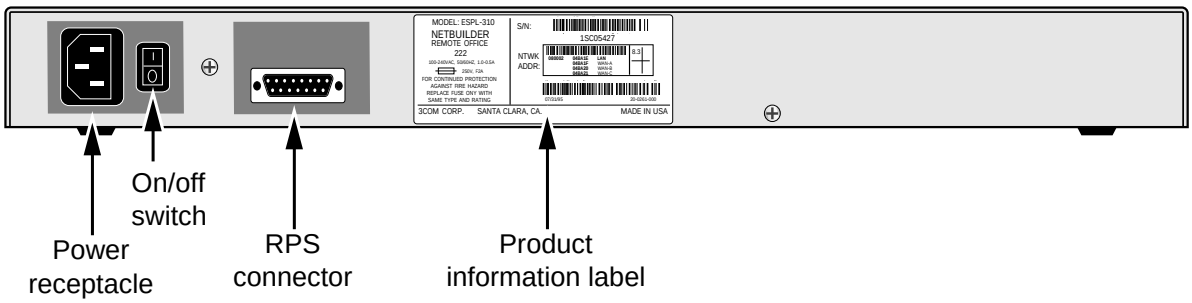

Figure 2-2 Chassis Back Panel

LEDs

See "LED Meanings" on page 4-3 for a complete description of the SuperStack II bridge/router LEDs.

Hardware Interrupt Switch

The hardware interrupt switch is located on the left side of the bridge/router (when facing the front panel). It is recessed into an opening near the DIP switches. Press the switch with a nonconductive object, such as a plastic stylus to put the system into the monitor firmware utility.

WARNING: *Use only a nonconductive object such as a plastic stylus to press the hardware interrupt switch. Do not use the tip of a pencil. Graphite particles from the pencil may cause you to receive an electric shock and damage components on the motherboard.*

Connectors and Cables

This section describes each connector on the bridge/router.

Console Cables

You can connect a PC running a terminal emulation program, a terminal, or a modem to the Console port on the SuperStack II bridge/router.

WARNING: *To eliminate cable noise emission in excess of FCC Part 15, Subpart J, and EN55022 B, this device cable should be shielded and have connectors with metallic backshells.*

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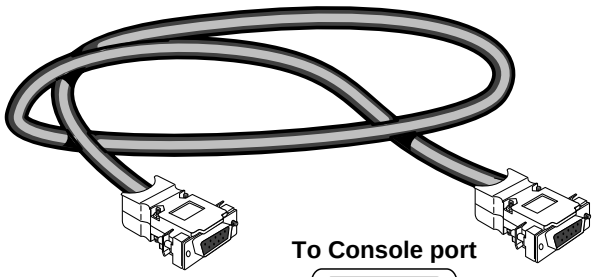
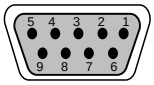
PC Cable

Figure 2-3 shows the pinouts for a 9-pin female to 9-pin female PC cable. A null modem-type cable may be used.

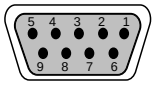


To Console port



9-pin female connector

To PC serial port



9-pin female connector

Name	Abbr	Pin		Pin	Abbr	Name
Receive Data	RxD	2	←	3	TxD	Transmit Data
Transmit Data	TxD	3	→	2	RxD	Receive Data
Carrier Detect	CD	1	←	7	RTS	Request to Send
Clear to Send	CTS	8				
Request to Send	RTS	7	→	8	CTS	Clear to Send
				1	CD	Carrier Detect
Signal Ground	Gnd	5	—	5	GND	Signal Ground
Data Terminal Ready	DTR	4	→	6	DSR	Data Set Ready
Data Set Ready	DSR	6	←	4	DTR	Data Terminal Ready

Figure 2-3 9-pin to 9-pin PC Cable (Null Modem-Type)

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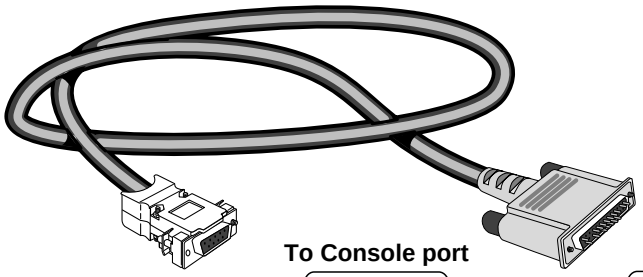
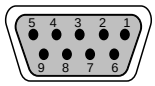
Terminal Cable

Figure 2-4 shows the pinouts for a 9-pin female to 25-pin terminal cable. A null modem-type cable may be used.

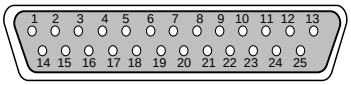


To Console port



9-pin female connector

To terminal



25-pin male or female connector

Name	Abbr	Pin		Pin	Abbr	Name
Receive Data	RxD	2	←	2	TxD	Transmit Data
Transmit Data	TxD	3	→	3	RxD	Receive Data
Carrier Detect	CD	1	←	4	RTS	Request to Send
Clear to Send	CTS	8				
Request to Send	RTS	7	→	5	CTS	Clear to Send
				8	CD	Carrier Detect
Signal Ground	GND	5	—	7	GND	Signal Ground
Data Terminal Ready	DTR	4	→	6	DSR	Data Set Ready
Data Set Ready	DSR	6	←	20	DTR	Data Terminal Ready

Figure 2-4 9-pin to 25-pin Terminal Cable (Null Modem-Type)

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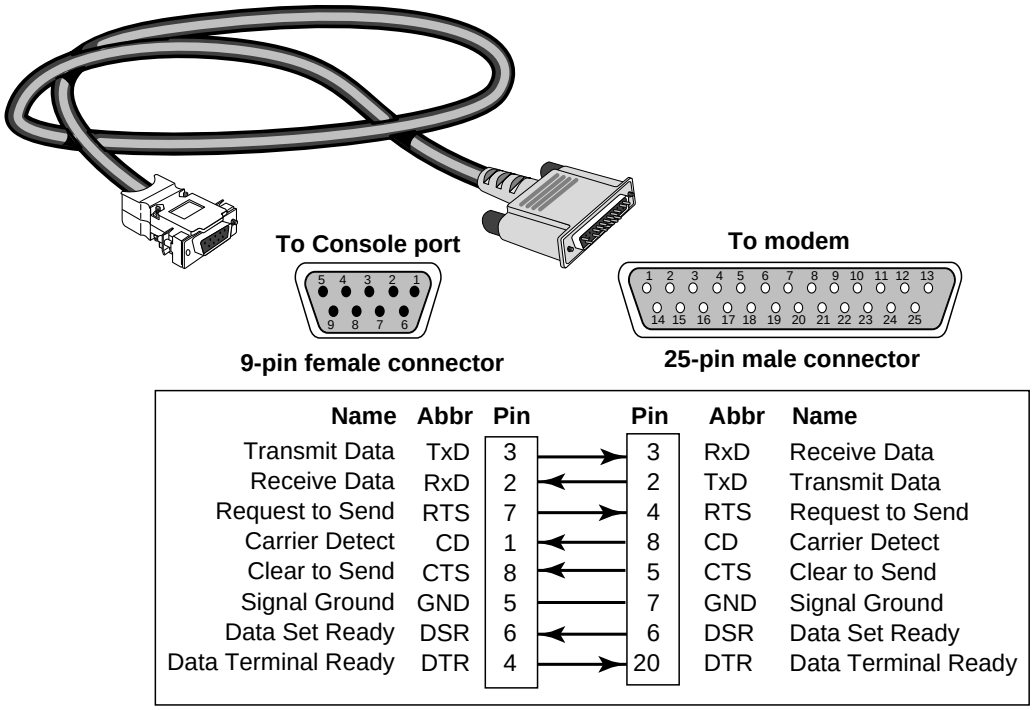
Modem Cable

Figure 2-5 shows the pinouts for a 9-pin female to 25-pin male modem cable. A straight-through-type cable may be used.


To Console port
To modem
5 4 3 2 1
9 8 7 6
1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25
9-pin female connector
25-pin male connector

Name	Abbr	Pin		Pin	Abbr	Name
Transmit Data	TxD	3	→	3	RxD	Receive Data
Receive Data	RxD	2	←	2	TxD	Transmit Data
Request to Send	RTS	7	→	4	RTS	Request to Send
Carrier Detect	CD	1	←	8	CD	Carrier Detect
Clear to Send	CTS	8	←	5	CTS	Clear to Send
Signal Ground	GND	5	—	7	GND	Signal Ground
Data Set Ready	DSR	6	←	6	DSR	Data Set Ready
Data Terminal Ready	DTR	4	→	20	DTR	Data Terminal Ready

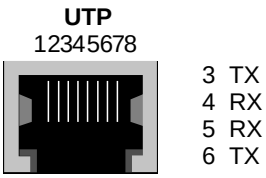
Figure 2-5 9-pin to 25-pin Modem Cable (Straight-Through-Type)

LAN Connectors and Cables

The bridge/router has two token ring connectors. Only one connector can be used at one time.

UTP Connector and Cable

The following figure shows the pinouts of the UTP connector (RJ-45). The connector bodies connect the cable shield to chassis ground.



RJ-45 female (shielded)

Table 2-2 lists cable types, multistation access units (MAUs), and emissions classes compatible with the UTP connector.

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Table 2-2 UTP Cable Types, MAUs, and Emissions Compliance

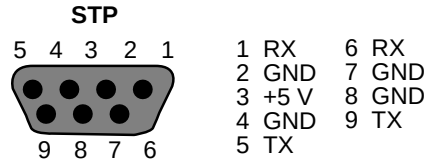
Cable Type		MAUs		Emissions Compliance*	
		Passive	**Active Retimed**	**FCC and VCCI Class A**	**EN55022 and VDE Class B**
UTP†	100 ohm:				
	Category 3	no	yes	yes	no
	Category 4	yes	yes	yes	no
	Category 5	yes	yes	yes	no
Shielded UTP†	100 ohm:				
	Category 3	no	yes	yes	yes
	Category 4	yes	yes	yes	yes
	Category 5	yes	yes	yes	yes

* Shielding of all cable types should be terminated 360 degrees at the cable plug.

† All UTP compliance testing was accomplished using cables built with Stewart Connector Co. connector, part number 940 SP-36-08-08.

STP Connector and Cable

The following figure shows the pinouts of the STP connector (DB-9). The connector bodies connect the cable shield to chassis ground.



DB-9 female (shielded)

Table 2-2 lists cable types, multistation access units (MAUs), and emissions classes compatible with the STP connector.

Table 2-3 STP Cable Types, MAUs, and Emissions Compliance

Cable Type		MAUs		Emissions Compliance*	
		Passive	**Active Retimed**	**FCC and VCCI Class A**	**EN55022 and VDE Class B**
STP	150 ohm:				
	IBM Type 1	yes	yes	yes	yes
	IBM Type 6	yes	yes	yes	yes

* Shielding of all cable types should be terminated 360 degrees at the cable plug.

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Auxiliary Power. Auxiliary +5 volt power is available on the STP connector for specialty powered MAUs, powered port expanders, or signal conversion devices such as token ring STP-to-fiber optic transceivers. To use the auxiliary power pins, follow the guidelines in Table 2-4.

Table 2-4 Auxiliary Pin Use

Pinout (STP)	Maximum Current
Pin 3	+5 volts (+/- 10%), 500 mA (fused at 2.5 A)
Pins 2, 4, 7, 8	Ground pins

3Com does not guarantee compatibility with external devices that use the auxiliary power pins of the STP connector. Consult the manufacturer of external devices to ensure compliance with the maximum current allowed and to ensure the device does not compromise STP token ring signalling.

Cabling Standards

Cabling should be installed in accordance with the following standards:

- EIA/ TIA-568 – Commercial building telecommunications wiring standard
- TSB-36 – Additional cable specifications for unshielded twisted pair cables
- IBM cabling guidelines

Table 2-5 summarizes the maximum number of workstations supported on a token ring network.

Table 2-5 Maximum Workstations on a Token Ring Network

Cable Type	Token Ring Speed 4 Mbps	Token Ring Speed 16 Mbps
STP	250 stations	250 stations
UTP	144 stations	250 stations

Ports on active retimed MAUs usually count as one “station.” If your device is plugged into an active retimed MAU, the device and the MAU port total two “stations.” For example, a token ring with all active retimed MAUs will support a total of 125 devices with STP cabling. A token ring with all passive MAUs will support a total of 250 devices with STP cabling. Check the documentation for your MAU for port and ring in/out station equivalencies.

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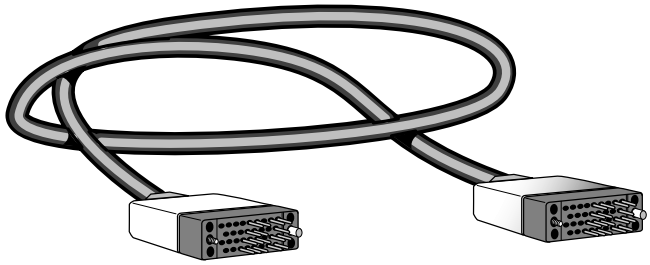
Serial Cables

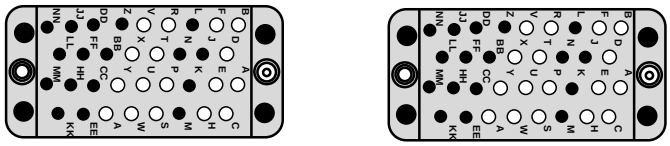
The following cables can be used with the serial port connectors.

V.35 to V.35 DCE Cable (32x)

This straight-through cable connects the V.35 port on a bridge/router to a standard V.35 DCE device.



To V.35 port on bridge/router **To DCE**



V.35 male connector **V.35 male connector**

Name	Abbr	Pin		Pin	Abbr	Name
Frame Ground	FG	A	—	A	FG	Frame Ground
Signal Ground	SG	B	—	B	SG	Signal Ground
Request to Send	RTS	C	—	C	RTS	Request to Send
Clear to Sent	CTS	D	—	D	CTS	Clear to Sent
Data Set Ready	DSR	E	—	E	DSR	Data Set Ready
Receive Line Signal Detect	RLSD	F	—	F	RLSD	Receive Line Signal Detect
Data Terminal Ready	DTR	H	—	H	DTR	Data Terminal Ready
Send Data (A)	SD+	P	—	P	SD+	Send Data (A)
Receive Data (A)	RD+	R	—	R	RD+	Receive Data (A)
Send Data	SD-	S	—	S	SD-	Send Data
Received Data (B)	RD-	T	—	T	RD-	Received Data (B)
Serial clock Transmit External (A)	SCTE+	U	—	U	SCTE+	Serial Clock Transmit External (A)
Serial Clock Receive (A)	SCR+	V	—	V	SCR+	Serial Clock Receive (A)
Serial clock Transmit External (B)	SCTE-	W	—	W	SCTE-	Serial Clock Transmit External (B)
Serial Clock Receive (B)	SCR-	X	—	X	SCR-	Serial Clock Receive (B)
Serial Clock Transmit (A)	SCT+	Y	—	Y	SCT+	Serial Clock Transmit (A)
Serial Clock Transmit (B)	SCT-	AA	—	AA	SCT-	Serial Clock Transmit (B)

Figure 2-6 V.35 Straight-Through Cable

3Com does not sell this cable.

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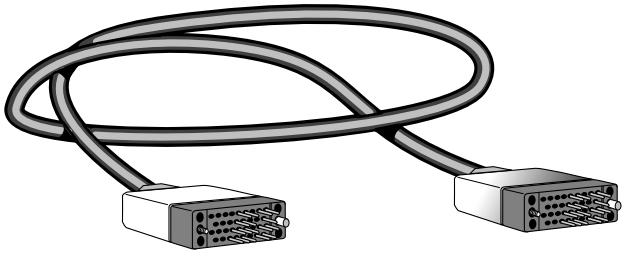
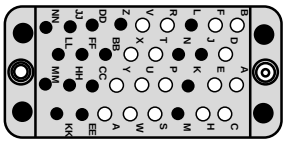
V.35 to V.35 Direct Connect Cable (32x)

This cable connects a V.35 port of the bridge/router to a V.35 port of an SNA legacy device.

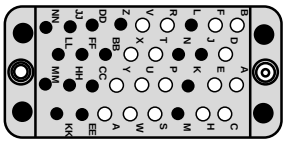


To V.35 port on bridge/router



V.35 male connector

To V.35 SNA Device



V.35 male connector

Signal	Name	Pin		Pin	Name	Signal
Shield	Shield	A		A	Shield	Shield
Clear to Send	CTS	C		D	RTS	Request to Send
Transmitted Data	TXD-A	P		R	RXD-A	Received Data
Transmitted Data	TXD-B	S		T	RXD-B	Received Data
Received Data	RXD-A	R		P	TXD-A	Transmitted Data
Received Data	RXD-B	T		S	TXD-B	Transmitted Data
Request to Send	RTS	C		F	DCD	Receive Line Signal Detect
Data Terminal Ready	DTR	H		E	DSR	Data Set Ready
Data Set Ready	DSR	E		H	DTR	Data Terminal Ready
Signal Ground	SG	B		B	SG	Signal Ground
Receive Signal Element Timing	RXC-A	V		U	TXC-A (out)	Transmit Signal Element Timing
Receive Signal Element Timing	RXC-B	X		W	TXC-B (out)	Transmit Signal Element Timing
Transmit Signal Element Timing	TXC-A (out)	U		Y	TXC-A (in)	Transmit Signal Element Timing
Transmit Signal Element Timing	TXC-B (out)	W		AA	TXC-B (in)	Transmit Signal Element Timing
Receive Signal Element Timing	RXC-A (dce)	EE		V	RXC-A	Receive Signal Element Timing
Receive Signal Element Timing	RXC-B (dce)	CC		X	RXC-B	Receive Signal Element Timing

Figure 2-7 V.35 to V.35 Direct-Connect Cable

3Com does not sell this cable.

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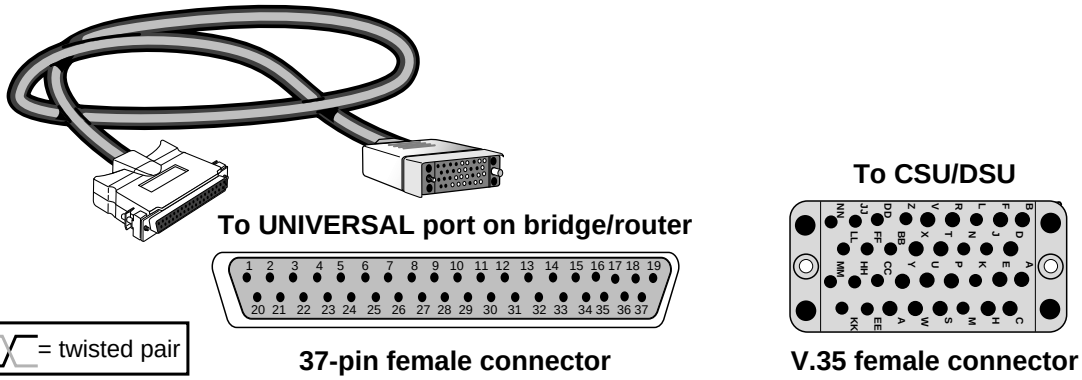
UNIVERSAL to V.35 Adapter Cable

To connect a SuperStack II bridge/router to a V.35 DCE device, cable the UNIVERSAL connector using a V.35 adapter cable.

Figure 2-8 shows the pin assignments of the V.35 adapter cable.

When constructing your own V.35 adapter cables, the required cable type is equivalent to Belden part number 9835. Cable length is limited to CCITT standard V.11 Appendix I.2.


To CSU/DSU
To UNIVERSAL port on bridge/router
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
= twisted pair
37-pin female connector
V.35 female connector

Name	Abbr	Pin		Pin	Abbr	Name
Shield	Sheild	1	braid	A	FG	Frame Ground
Signal Ground	SG	19		B	SG	Signal Ground
Term in Service	TS	28		C	RTS	Request to send
Send Data	SD (A)	4		P	SD+	Send Data +
Send Data	SD (B)	22		S	SD-	Send Data -
Received Data	RD (A)	6		R	RD+	Received Data (A)
Received Data	RD (B)	24		T	RD-	Receive Data (B)
Signal Rate indication	SI	2		D	CTS	Clear to Send
Select Frequency	SF	16		E	DSR	Data Set Ready
Signal Quality	SQ	33		F	RLSD	Recieve Line Signal Detect
Standby Select	SS	32		H	DTR	Data Terminal Ready
Terminal Timing	TT (A)	17		U	SCTE+	Serial Clock Transmit External (A)
Terminal Timing	TT (B)	35		W	SCTE-	Serial Clock Transmit External (B)
Sending Timing	ST (A)	5		Y	SCT+	Serial Clock Transmit (A)
Sending Timing	ST (B)	23		AA	SCT-	Serial Clock Transmit (B)
Receive Timing	RT (A)	8		V	SCR+	Serial Clock Receive (A)
Receive Timing	RT (B)	26		X	SCR-	Serial Clock Receive (B)
Remote Loopback	RL	14		N	-	Reserved for future use
Local Loopback	LL	10		L	-	Reserved for future use
New Signal	NS	34		J	RI	Ring Indicator
Standby Indicator	SB	36		NN	-	Reserved for future use

Figure 2-8 UNIVERSAL to V.35 Adapter Cable

You can order this cable from 3Com (part number 3C8035).

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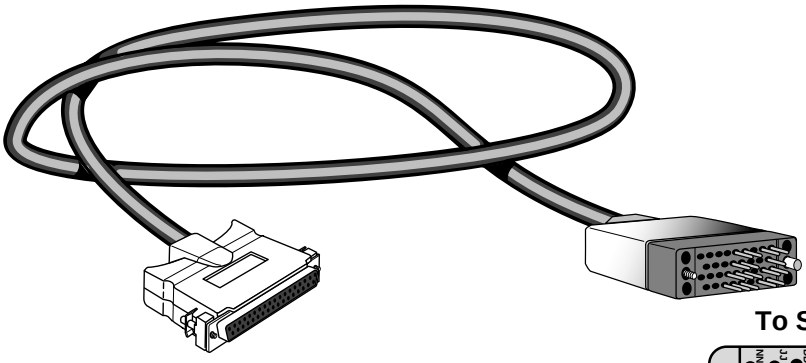
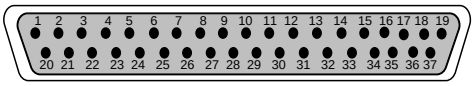
UNIVERSAL to V.35 Direct Connect Cable

This cable connects a UNIVERSAL port on the bridge/router to the V.35 port on an SNA legacy device.

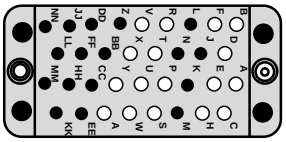


To UNIVERSAL port on bridge/router



37-pin female connector

To SNA device



V.35 male connector

Name	Abbr	Pin		Pin	Abbr	Name
Shield	Shield	1		A	Shield	Shield
Clear to Send	CTS	C		D	RTS	Request to Send
Transmit Data	TxD (A)	4		R	RxD (A)	Receive Data
Transmit Data	TxD (B)	22		T	RxD (B)	Receive Data
Receive Data	RxD (A)	6		P	TxD (A)	Transmit Data
Receive Data	RxD (B)	24		S	TxD (B)	Transmit Data
Request to Send	RTS	28		F	DCD	Receive Line Signal Detect
Data Set Ready	DSR	16		H	DTR	Data Terminal Ready
Data Terminal Ready	DTR	32		E	DSR	Data Set Ready
Signal Ground	SG	19		B	SG	Signal Ground
Receive Clock	RxC (A)	8		U	TxC (A) (out)	Transmit Clock
Receive Clock	RxC (B)	26		W	TxC (B) (out)	Transmit Clock
Transmit Clock	TxC (A) (out)	17		Y	TxC (A) (in)	Transmit Clock
Transmit Clock	TxC (B) (out)	35		AA	TxC (B) (in)	Transmit Clock
Transmit Clock	TxC (A) (dce)	17		V	RxC (A)	Receive Clock
Transmit Clock	TxC (B) (dce)	35		X	RxC (B)	Receive Clock

Figure 2-9 UNIVERSAL to V.35 Direct Connect Cable

You can order this cable from 3Com (part number 3C8135).

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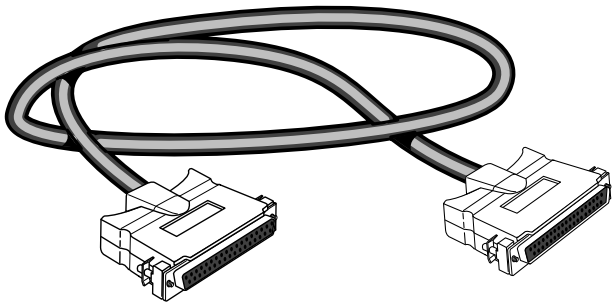
UNIVERSAL to RS-449/V.36 DCE Cable

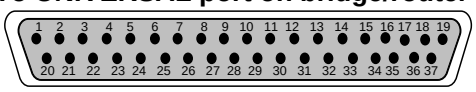
To connect a SuperStack II bridge/router to a V.36 DCE device, cable the UNIVERSAL connector using a V.36 adapter cable.

Figure 2-10 shows the pin assignments of the V.36 adapter cable.

When constructing your own V.36 adapter cables, the required cable type is equivalent to Belden part number 9835. Cable length is limited to CCITT standard V.11 Appendix I.2.

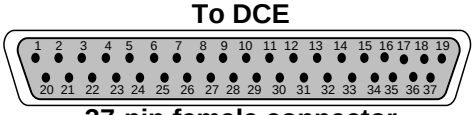


To UNIVERSAL port on bridge/router



37-pin female connector

To DCE



37-pin female connector

Name	Abbr	Pin	Pin	Abbr	Name
Shield	Shield	1	1	Shield	Shield
Send Data	SD (A)	4	4	SD (A)	Send Data
Send Data	SD (B)	22	22	SD (B)	Send Data
Receive Data	RD (A)	6	6	RD (A)	Receive Data
Receive Data	RD (B)	24	24	RD (B)	Receive Data
Incoming Call	IC	15	15	IC	Incoming Call
Signal Ground	SG	19	19	SG	Signal Ground
Clear to Send	CS (A)	9	9	CS (A)	Clear to Send
Clear to Send	CS (B)	27	27	CS (B)	Clear to Send
Request to Send	EIA (A)	7	7	EIA (A)	Request to Send
Request to Send	EIA (B)	25	25	EIA (B)	Request to Send
Data Mode	DM (A)	11	11	DM (A)	Data Mode
Data Mode	DM (B)	29	29	DM (B)	Data Mode
Terminal Ready	TR (A)	12	12	TR (A)	Terminal Ready
Terminal Ready	TR (B)	30	30	TR (B)	Terminal Ready
Receiver Ready	RR (A)	13	13	RR (A)	Receiver Ready
Receiver Ready	RR (B)	31	31	RR (B)	Receiver Ready
Receive Timing	RT (A)	8	8	RT (A)	Receive Timing
Receive Timing	RT (B)	26	26	RT (B)	Receive Timing
Terminal Timing	TT (A)	17	17	TT (A)	Terminal Timing
Terminal Timing	TT (B)	35	35	TT (B)	Terminal Timing
Send Timing	ST (A)	5	5	ST (A)	Send Timing
Send Timing	ST (B)	23	23	ST (B)	Send Timing
Send Common	SC	37	37	SC	Send Common
Receive Common	RC	20	20	RC	Receive Common

Figure 2-10 UNIVERSAL to V.36 Adapter Cable

3Com does not sell this cable.

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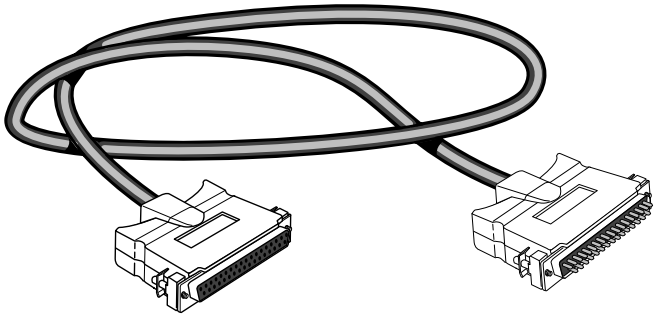
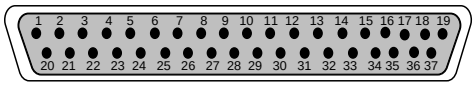
UNIVERSAL to RS-449/V.36 Direct Connect Cable

This cable connects the UNIVERSAL connector on the bridge/router to the RS-449/V.36 port of an SNA legacy device.

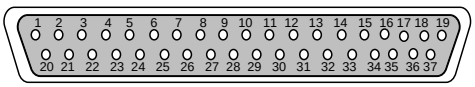


To UNIVERSAL port on bridge/router



37-pin female connector

To RS449/V.36 SNA Device



RS-449 male connector

Name	Abbr	Pin	Pin	Abbr	Name
Shield	Shield	1	1	Sheild	Shield
Request to Send	EIA (A)	7	9	CS (A)	Clear to Send
Request to Send	EIA (B)	25	27	CS (B)	Clear to Send
Transmit Data	SD (A)	4	6	RD (A)	Receive Data
Transmit Data	SD (B)	22	24	RD (B)	Receive Data
Receive Data	RD (A)	6	4	SD (A)	Send Data
Receive Data	RD (B)	24	22	SD (B)	Send Data
Request to Send	EIA (A)	7	13	RR (A)	Receiver Ready
Request to Send	EIA (B)	25	31	RR (B)	Receiver Ready
Data Mode	DM (A)	11	12	TR (A)	Terminal Ready
Data Mode	DM (B)	29	30	TR (B)	Terminal Ready
Terminal Ready	TR (A)	12	11	DM (A)	Data Mode
Terminal Ready	TR (B)	30	29	DM (B)	Data Mode
Receive Timing	RT (A)	8	17	TT (A)	Terminal Timing
Receive Timing	RT (B)	26	35	TT (B)	Terminal Timing
Terminal Timing	TT (A)	17	5	ST (A)	Send Timing
Terminal Timing	TT (B)	35	23	ST (B)	Send Timing
Terminal Timing	TT (A)	17	8	RT (A)	Receive Timing
Terminal Timing	TT (B)	35	26	RT (B)	Receive Timing
Signal Ground	SG	19	19	SG	Terminal Timing
Send Common	SC	37	37	SC	Send Common
Receive Common	RC	20	20	RC	Receive Common

Figure 2-11 UNIVERSAL to RS-449/V.36 Direct-Connect Cable

3Com does not sell this cable.

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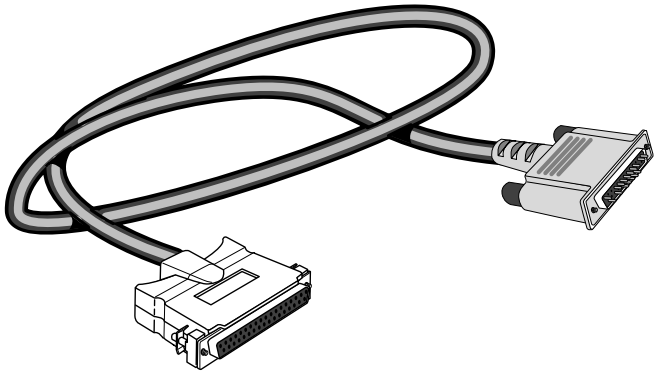
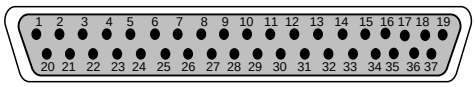
UNIVERSAL to RS-232 DCE Cable

This cable connects the UNIVERSAL port on a SuperStack II NETBuilder bridge/router to an RS-232 interface on a DCE device.

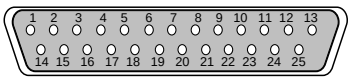


To UNIVERSAL port on bridge/router



37-pin female connector

To DCE



25-pin male connector

Name	Abbr	Pin		Pin	Abbr	Name
Shield	Shield	1		1	Chas. GND	Shield
Remote Loopback	RL	14		2	TxD	Transmit Data
Standby Indicator	SB	36		3	RxD	Receive Data
Teminal in Service	TS	28		4	RTS	Request to Send
Signal Rate Indicator	SI	2		5	CTS	Clear to Send
Select Frequency	SF	16		6	DSR	DCE Ready
Standby Select	SS	32		20	DTR	DTE Ready
Signal Quality	SQ	33		8	CD	Carrier Detect
Test Mode	TM	18		17	RxC(SCR)	Receive Clock - DCE Source
Incoming Call	IX	15		15	TxC(SCT)	Transmit Clock - DCE Source
Local Loopback	LL	10		24	TT(SCTE)	Transmit Clock - DTE Source
New Signal	NS	34		22	RI	Ring Indicator
Signal Ground	SG	19		7	GND	Signal Ground

Figure 2-12 UNIVERSAL to RS-232 DCE Cable

You can order this cable from 3Com (part number 3C8023).

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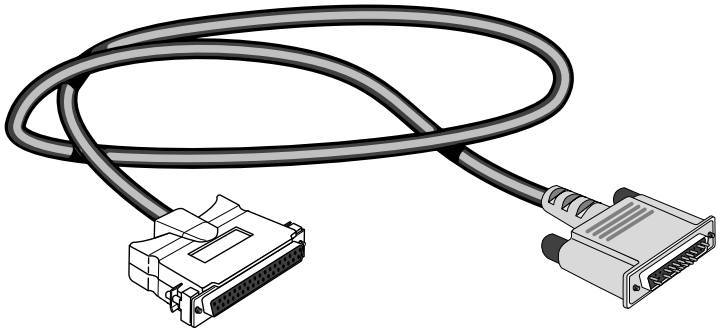
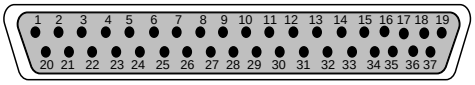
UNIVERSAL to RS-232 Direct Connect Cable

This cable connects the UNIVERSAL port on the bridge/router to the RS-232 port on an SNA legacy device.

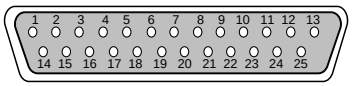


To UNIVERSAL port on bridge/router



37-pin female connector

To SNA device



25-pin male connector

Name	Abbr	Pin	Pin	Abbr	Name
Shield	Shield	1	1	Shield	Shield
Clear to Send	CTS	4	5	RTS	Request to Send
Transmit Data	TxD	14	3	RxD	Receive Data
Receive Data	RxD	36	2	TxD	Transmit Data
Request to Send	RTS	28	8	DCD	Carrier Detect
Data Set Ready	DSR	16	20	DTR	DTE Ready
Data Terminal Ready	DTR	32	6	DSR	DCE Ready
Receive Clock	RxC	18	24	TxC (out)	Transmit Clock
Transmit Clock	TxC (out)	10	15	TxC (in)	Transmit Clock
			17	RxC	Receive Clock
Signal Ground	SG	19	7	SG	Signal Ground

Figure 2-13 UNIVERSAL to RS-232 Direct-Connect Cable

You can order this cable from 3Com (part number 3C8123).

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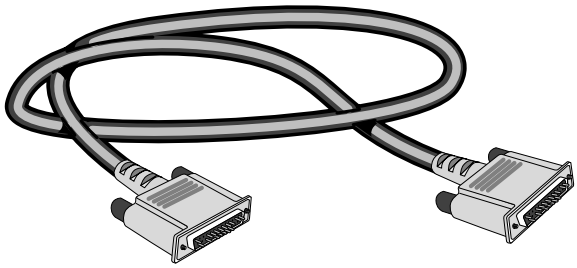
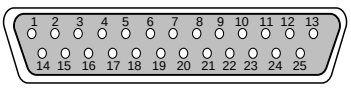
RS-232 to RS-232 DCE Cable

This straight-through cable connects the RS-232 port on a SuperStack II bridge/router to a standard RS-232 DCE device.

Figure 2-14 shows the pin assignments of the RS-232 cable.

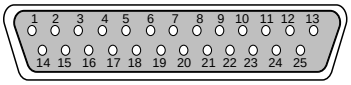


To RS-232 port on bridge/router



25-pin male connector

To modem/TA or CSU/DSU



25-pin male connector

Name	Abbr	Pin	Pin	Abbr	Name
Shield	Chassis GND	1	1	Chassis GND	Shield
Transmit Data	TxD	2	2	TxD	Transmit Data
Receive Data	RxD	3	3	RxD	Receive Data
Request to Send	RTS	4	4	RTS	Request to Send
Clear to Send	CTS	5	5	CTS	Clear to Send
DCE Ready	DSR	6	6	DSR	DCE Ready
Signal Ground	GND	7	7	GND	Signal Ground
Carrier Detect	CD	8	8	CD	Carrier Detect
Transmit Clock	TxC (SCT)	15	15	TxC (SCT)	Transmit Clock
Receive Clock	RxC (SCR)	17	17	RxC (SCR)	Receive Clock
DTE Ready	DTR	20	20	DTR	DTE Ready
Remote Loopback	RL	21	21	RL	Remote Loopback
Ring Indicator	RI	22	22	RI	Ring Indicator
Transmit Clock (DTE Source)	TT (SCTE)	24	24	TT (SCTE)	Transmit Clock (DTE Source)
Test Mode	TM	25	25	TM	Test Mode

Figure 2-14 RS-232 Straight-Through Cable

3Com does not sell this cable.

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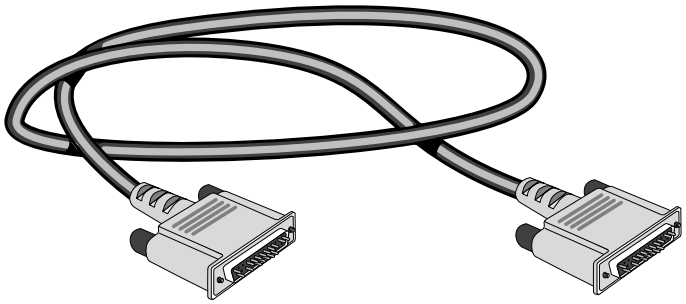
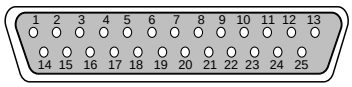
RS-232 to RS-232 Direct Connect Cable

This cable connects the RS-232 port on the bridge/router to an RS-232 port on an SNA legacy device.

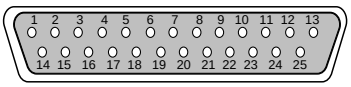


To RS-232 port on bridge/router



25-pin male connector

To SNA device



25-pin male connector

Name	Abbr	Pin	Pin	Abbr	Name
Shield	Chas. GND	1	1	Chas. GND	Shield
Clear to Send	CTS	5	5	CTS	Clear to Send
Transmit Data	TxD	2	3	RxD	Receive Data
Receive Data	RxD	3	2	TxD	Transmit Data
Request to Send	RTS	4	8	CD	Carrier Detect
DCE Ready	DSR	6	20	DTR	DTE Ready
Signal Ground	GND	7	7	GND	Signal Ground
DTE Ready	DTR	20	6	DSR	DCE Ready
Receive Clock - DCE Source	RxC(SCR)	17	24	TT(SCTE)	Transmit Clock - DTE Source
Transmit Clock - DTE Source	TT(SCTE)	24	15	TxC(SCT)	Transmit Clock - DCE Source
Secondary Receive Data	SRD	16	17	RxC(SCR)	Receive Clock - DCE Source

Figure 2-15 RS-232 to RS-232 Direct-Connect Cable

You can order this cable from 3Com (part number 3C8132).

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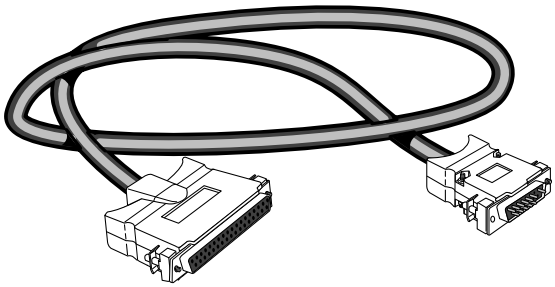
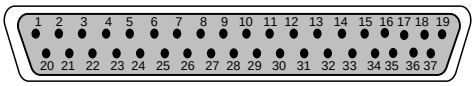
UNIVERSAL to X.21 Adapter Cable

If you want to connect any of the SuperStack II bridge/routers documented in this guide to an X.21 DCE device, cable the connector marked UNIVERSAL using an X.21 adapter cable.

Figure 2-16 shows the pin assignments of the X.21 adapter cable.

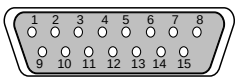


To Universal port on bridge/router



37-pin female connector

To modem/TA or CSU/DSU



15-pin male connector

Name	Abbr	Pin		Pin	Abbr	Name
Send Data	SD (A)	4		2	TA	Transmit Data (A)
Send Data	SD (B)	22		9	TB	Transmit Data (B)
Receive Data	RD (A)	6		4	RA	Receive Data (A)
Receive Data	RD (B)	24		11	RB	Receive Data (B)
Send Timing	ST (A)	5		6	SA	Receive Clock
Receive Timing	RT (A)	8				
Send Timing	ST (B)	23		13	SB	Receive Clock
Receive Timing	RT (B)	26				
Terminal Ready	TR (A)	12		3	CA	Control (A)
Terminal Ready	TR (B)	30		10	CB	Control (B)
Data Mode	DM (A)	11		5	IA	Indicate (A)
Data Mode	DM (B)	29		12	IB	Indicate (B)
Request to Send	EIA (A)	7				
Receiver Ready	RR (A)	13				
Clear to Send	CS (A)	9				
Request to Send	EIA (B)	25				
Receiver Ready	RR (B)	31				
Clear to Send	CS (B)	27				
Signal Ground	SG	19		8	GND	Ground
Shield	Sheild	1	braid	1	Sheild	Shield Drain

Figure 2-16 UNIVERSAL to X.21 Adapter Cable

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When constructing your own X.21 adapter cables, the required cable type is equivalent to Belden part number 9839. Cable length is limited to CCITT standard V.11 Appendix I.2.

You can order the X.21 adapter cable from 3Com (part number 3C8021).

X.21 European Connector Compliances. For installations where compliance to the European standard NET 1 is required, use an X.21 15-pin male connector (ISO 4903) to construct the RS-449-to-X.21 conversion cable. For compliance in Austria, Denmark, Finland, Germany, and the United Kingdom, use M3-threaded attaching screws with this connector.

ISDN Cable (Model 52x)

To connect a model 52x bridge/router to an ISDN network, use an ISDN cable with an RJ-45 connector. 3Com does not supply this cable.

Table 2-6 shows the pin assignments of the cable with both ends terminated in RJ-45 connectors.

Table 2-6 ISDN Cable Pinouts

Pin No.	Function	Signal
1	Not connected	NC
2	Not connected	NC
3	Transmit data (plus)	TXD+
4	Receive data (plus)	RXD+
5	Receive data (minus)	RXD-
6	Transmit data (minus)	TXD-
7	Not connected	NC
8	Not connected	NC

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Physical Specifications

Table 2-7 provides the environmental requirements of model 32x and 52x bridge/routers.

Table 2-7 Environmental Requirements for Model 32x and 52x Bridge/Routers

Parameter	Minimum Requirement	Maximum Requirement
Temperature		
Operating	5 °C	40 °C
Nonoperating	-40 °C	75 °C
Altitude		
Operating	15,000 ft	15,000 ft
Nonoperating	40,000 ft	40,000 ft
Relative Humidity		
Operating	10% noncondensing	90% noncondensing
Nonoperating	10% noncondensing	90% noncondensing

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3 UPGRADING MEMORY

The following memory upgrades are available from 3Com for your bridge/router:

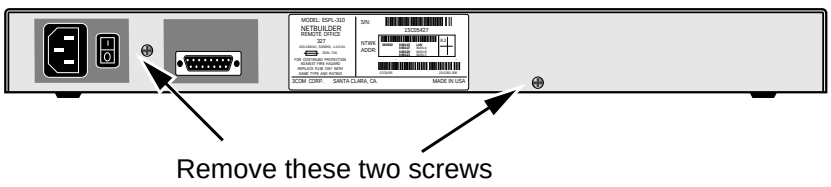
- 4 MB (3C8104) flash memory
- 4 MB DRAM (3C8040)

Complete the following sections to install flash memory or DRAM in your SuperStack II bridge/router.

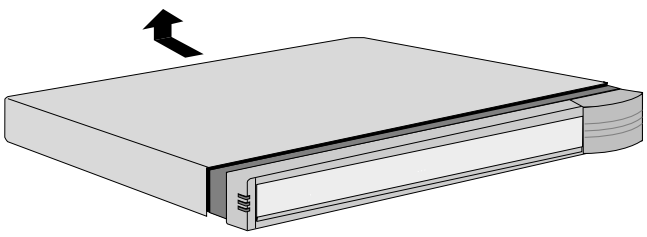
CAUTION: *If you install the flash memory upgrade and then remove it from your system after startup, you will need to reload the system software using the procedures described in the software guide.*

Removing the Cover

1. Turn off the power and unplug the power cord from your SuperStack II bridge/router. Unplug the RPS cable, if connected.
2. Remove the two screws on the back of the bridge/router.



3. Slide the cover back and up off the bridge/router.



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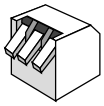
CAUTION: *Make sure you do not accidentally alter the dip switch settings when you remove the cover.*



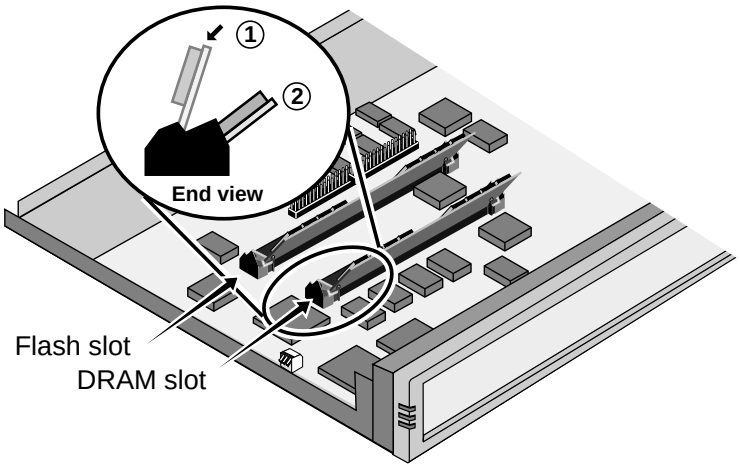
Dip switches should all be in the down position

Installing Memory

To install the flash memory and/or DRAM SIMM, follow these steps:

1. With the chips facing toward the back of the bridge/router, place the silver connector edge of the SIMM into the appropriate SIMM socket at almost a 90-degree angle.
2. Align the semicircular notch with the ridge in the SIMM socket.

   Do not force the SIMM. It can be installed in only one direction.
3. Once the SIMM is aligned, gently push down on the outer corners of the SIMM until it snaps into place.



CAUTION: *Before continuing with the next section, be sure that all screws and pins are properly seated and the dip switches are properly aligned.*

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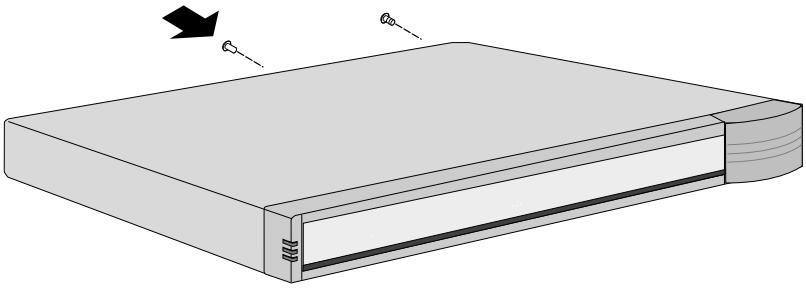
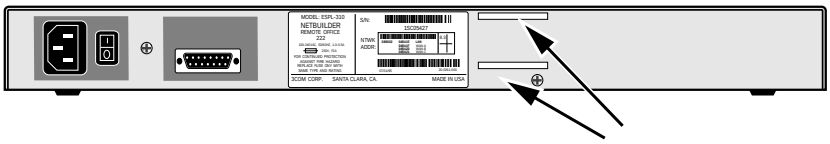
Reinstalling the Cover

1 Reinstall the cover on the SuperStack II bridge/router and reattach it to the chassis with the two screws.



2 Place the upgrade sticker included in your kit on the chassis, as shown.

If you have both the flash memory and the DRAM memory upgrade kits, place one sticker from each kit as shown.



Place upgrade sticker in either or both locations

3 Plug the power cord back into the bridge/router. If available, plug the RPS cable into the bridge/router.

4 Turn on the bridge/router.

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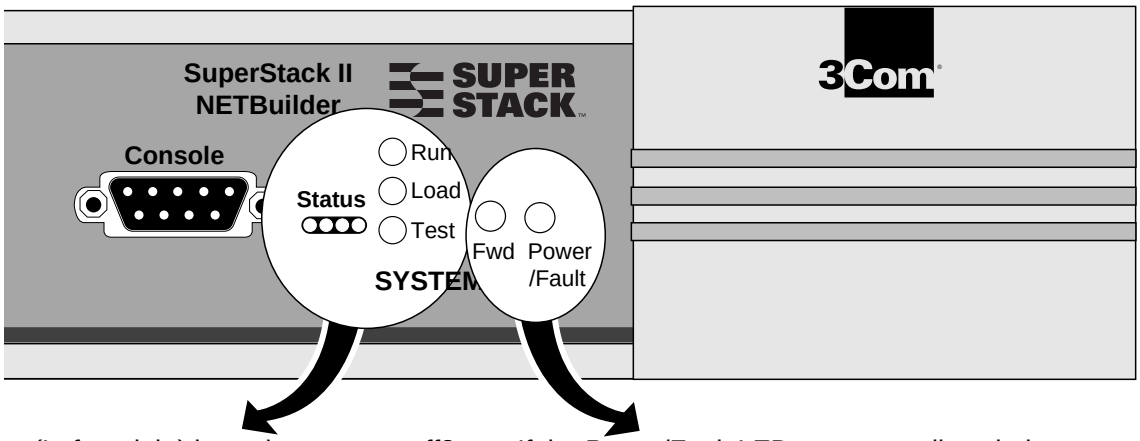
4 TROUBLESHOOTING

This chapter describes troubleshooting using the LEDs on the front panel of the system.

If the Power/Fault LED appears yellow at any time during the startup process, the bridge/router has encountered a problem during system test or system software load. If the Power/Fault LED appears yellow, check the other LEDs as shown in the following figure.



Status LEDs: (Left to right) is each one on or off?
Load LED: is it on constantly, or flashing?
Test LED: Is it on or off?

If the Power/Fault LED appears yellow during startup, check the other LEDs for related indications of the problem.

If the Test LED is lit, a problem occurred during the system test phase. Note the pattern of the Status LEDs and compare the results with the information in Table 4-1.

If the Load LED is lit, a problem occurred during the system software load phase. Note the pattern of the Status LEDs and compare the results with the information in Table 4-2.

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Troubleshooting During the Test Phase

When a problem occurs during the test phase, the Status LEDs light in a particular pattern. Table 4-1 shows the Status LED pattern, the problem associated with that pattern, and the action to take.

Table 4-1 System Self-test Errors

Status LEDs						
1	**2**	**3**	**4**	**Test LED**	**Power/Fault LED**	**Meaning and Action**
Off	Off	On	On	On	Yellow	*EEPROM checksum test failed.* Contact your network supplier.

Troubleshooting During the Load Phase

When a problem occurs during the load phase, the Status LEDs light in particular patterns. Table 4-2 shows the Status LED patterns, the problems associated with these patterns, and the actions to take.

Table 4-2 System Software Load Errors

Status LEDs						
1	**2**	**3**	**4**	**Load LED**	**Power/Fault LED**	**Meaning and Action**
Off	Off	On	On	On	Yellow	*Software image file has been deleted or boot source and image file names do not match.* Reload the system software. Refer to the software guide.
On	Off	Off	Off	On	Yellow	*Unable to transmit BOOTP request. Bridge/router is not connected to token ring correctly.* Check cable connections.
On	Off	Off	On	On	Yellow	*No response to BOOTP request. BOOTP server not present or incorrectly configured.* Check TFTP server configuration and verify the MAC address of the bridge/router. Press Reset to retry the system software load. If the load is unsuccessful, call your network supplier for assistance.
On	Off	On	Off	On	Yellow	*No response to Address Resolution Protocol (ARP) request from TFTP server. TFTP server not present or incorrectly configured.* Check TFTP server configuration and verify the MAC address of the bridge/router. Press Reset to retry the system software load If the load is unsuccessful, call your network supplier for assistance.

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Table 4-2 System Software Load Errors (continued)

Status LEDs						
1	**2**	**3**	**4**	**Load LED**	**Power/Fault LED**	**Meaning and Action**
On	On	On	On	On	Yellow	*Write to Flash File System failed.* Call your network supplier for assistance.

LED Meanings

Table 4-3 provides the meanings for the lit LEDs on a SuperStack II bridge/router.

Table 4-3 LED Meanings

Model No.	Associated Connector	LED	Meaning
323, 327, or 52x	Unshielded twisted pair (UTP) or shielded twisted pair (STP)	16 MB	The system is either attempting to enter or has successfully entered the token ring at the rate of 16 MB. This LED will not light if the system is either attempting to enter or has successfully entered the token ring at the rate of 4 MB.
323, 327, or 52x	UTP or STP	Active	The system is transmitting or receiving traffic.
323, 327, or 52x	UTP or STP	Fault	The system is experiencing a problem with the token ring connection. This LED resets if you reboot the system.
52x	ISDN (D channel)	Line Act	The ISDN line is activated.
52x	ISDN (D channel)	Line Error	Indicates a disconnected cable, or a loss of phantom power.
52x	ISDN B1, B2	Link	The path using B1 or B2 is up.
52x	ISDN B1, B2	Connect	An end-to-end B channel connection exists or is in progress.
52x	ISDN B1, B2	Fault	An error in the received frames is detected.
All	V.35, Universal, or RS-232	Link	The path is up.
All	V.35, Universal, or RS-232	Active	A physical connection to an active device has been established.
All	V.35, Universal, or RS-232	Fault	An error in the received frames is detected.
All	Not applicable	Status	Provides additional status for the Run, Load, and Test LEDs.
All	Not applicable	Run	The system software has successfully loaded and started running.
All	Not applicable	Load	The system software is being loaded.
All	Not applicable	Test	The system is executing self-tests.
All	Not applicable	Fwd	A packet is being forwarded between any two ports.
All	Not applicable	Power/ Fault	When the LED is green, the system has power and is operational. When the LED is yellow, a problem is preventing normal operation.

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Troubleshooting the Token Ring Connection

This section is not applicable to model 320. Table 4-4 summarizes problems that can occur with a token ring connection and what action you can take.

Table 4-4 Troubleshooting the Token Ring Connection (Models 327 and 527 only)

Symptom	Cause and Action
The LAN LEDs are doing the following: ■ 16 MB LED is blinking slowly (turning on then off at approximately 15 second intervals). ■ The Fault LED is on.	The following are possible problems indicated by the LED indicators: *Cable connection problem* The LAN cable may be improperly connected. Verify that the LAN cable is properly connected at both ends. Check the wall plate if used and the multistation access unit (MAU) of the central wiring center. *Bad cable* You may be cabling your STP or UTP connector with a faulty or improperly wired cable. Swap the cable for another cable that is known to work. *Bad concentrator port* The port or port connector of the MAU may be defective. Move the station's cable to another MAU port that is known to work. *Heavy network traffic* The Activity LED may remain off longer than expected. Wait for network traffic to subside. *Insertion at the wrong speed* The system may have attempted to enter the token ring network at the wrong speed. Check the setting of the ring speed for path 1. Boundary Router users may use the System Configuration menu to set the token ring speed. Full router users use SHow !1 -PATH BAud. Also, check the path to make sure that it is enabled (SHow !1 -PATH CONTrol). *Duplicate node address* Check to make sure that the MAC address of the system on your network is unique. *Token ring experiencing network error recovery* The Activity LED may remain off longer than expected. Wait for normal token ring operation after an automatic error recovery. If none of these actions solves your problem, contact your network supplier.

(continued)

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Table 4-4 Troubleshooting the Token Ring Connection (Models 327 and 527 only) (continued)

Symptom	Cause and Action
Path 1 is up, but the system does not appear to be communicating with other network devices.	*The system may have attempted to enter the token ring at the wrong speed.* Check the setting of the ring speed for path 1 (SHow !1 -PATH BAud). Make sure that the setting of this parameter matches the speed of the token ring network.
The following error message appears: `This is the only station on the ring`	*If your system is the first device to enter the ring, disregard this message. If there are multiple nodes on the ring, your system may be isolated.* **1** Determine the number of nodes on your ring. **2** If there are multiple nodes on the ring, check the setting of the ring speed for path 1. (In monitor mode, enter CL, then select ring speed from the menu that displays.) Make sure that the setting of this parameter matches the speed of the token ring network.

One of these error messages appears:
`Possible ring speed mismatch`
`Adapter is not connected to a ring`
or
`Open failed during phase - lobe media.`
	Possible physical connection problem or the system may have attempted to enter the token ring at the wrong speed.
	1 Check your LAN cable.
	2 Determine the ring speed of your token ring network.
	3 Check the setting of the ring speed for path 1. (In monitor mode, enter the CL, then select ring speed from the menu that displays.) Make sure that the setting of this parameter matches the speed of the token ring network.

Specialty powered wiring center (MAU) or signal conversion device (such as STP-to-fiber optic transceivers) will not work on STP connector.	*External device may have overstressed the auxiliary power's limits, lowering available voltage to unacceptable levels.* Refer to the cabling information in your hardware installation manual for voltage, current, and pinout specifications of this feature. Refer to the documentation that accompanies your external device for compatibility information. *External device may have blown the fuse of the system.* Return the system for fuse replacement. If these actions do not solve the problem, contact your network supplier.

(continued)

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Table 4-4 Troubleshooting the Token Ring Connection (Models 327 and 527 only) (continued)

Symptom	Cause and Action
The MAC address of the system does not appear on the token ring network.	*The MAC address on the network is in noncanonical format.* The MAC address encoded on the EEPROM and printed on the label is in canonical format and needs to be converted to noncanonical format. Each byte, represented by the number pairs below, consists of 8 bits. To convert the canonical byte 1A (in hexadecimal) to the noncanonical byte, you must mirror the bits, as shown. 08 00 02 [1A] 4B 5C canonical (least significant bit first) *is converted to* 10 00 40 [58] D2 3A noncanonical (most significant bit first) **1A** = **58** 0001 1010 0101 1000 The MacAddrConvert command converts a MAC address in canonical format to noncanonical format. For example, if you enter: **`MacAddrConvert 0800021A4B5C`** The system displays the following: `%10004058D23A`

If you experience a problem or receive an error message that is not documented in Table 4-4, contact your network supplier.

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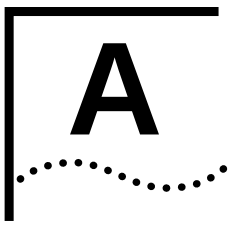

PROVISIONING YOUR ISDN LINE

This appendix provides North American (U.S. and Canada) and German provisioning information for the SuperStack II NETBuilder bridge/routers and boundary routers using an Integrated Services Digital Network (ISDN) line with a basic rate interface (BRI).

If your ISDN line is not provisioned correctly, you will not be able to use your SuperStack II bridge/router or boundary router to access a remote network.

Ordering North American ISDN BRI Services

To order ISDN service from your telephone company, follow these steps:

1. Call the telephone company and ask for the ISDN representative.
2. Tell the representative you want ISDN service for a SuperStack II NETBuilder ISDN bridge/router, and that you have the following information:
   - Line provisioning
   - ISDN outlet type
3. Give the representative the Bellcore ISDN ordering code (IOC). The IOC tells the telephone company which parameter settings to use for SuperStack II bridge/routers. The IOC for this product is "Capability R."

   Not all Regional Bell Operating Companies use IOCs. If the representative has the IOC for SuperStack II bridge/router listed, skip to step 7; otherwise, continue on to step 4.
4. Ask the representative which ISDN switch type your line uses. Place a check mark in the appropriate box on the ISDN Information Sheet in step 7.
5. Ask for an RJ-45 connector to be installed with your new ISDN outlet.

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6 If desired, ask for an NT1 to connect your SuperStack II bridge/router to the ISDN line. (You can also purchase an NT1 from a reseller.)

7 Fill out the ISDN Information Sheet:

ISDN Information Sheet

3Com SuperStack II Bridge/Router

ISDN Switch Type

- AT&T 5ESS NI1 ❒
- AT&T 5ESS Custom ❒
- Northern Telecom DMS 100 ❒
- Siemens EWSD ❒

Number of ISDN phone numbers (1 or 2)_____

Phone number 1 _____

Phone number 2 _____

SPID number for phone number 1 _____

SPID number for phone number 2 _____

Ask for the following information:

- **ISDN Switch Type.** Ask the representative which ISDN switch type your line uses. Place a check mark next to that switch on the ISDN Information Sheet. Each switch type has a corresponding provisioning information table later in this section.
- **Number of ISDN Phone Numbers.** Your ISDN line can support one or two phone numbers. Specify how many phone numbers you are ordering.
- **Phone Numbers.** Ask the telephone representative for your ISDN phone numbers and write them in the space provided.
- **Service Profile ID (SPID) Number.** Ask the telephone representative for your SPID numbers. (For a multipoint line, the telephone representative should provide two SPID numbers.) A SPID number has 10–15 characters; for example, 0155512120. Your switch type may not require the SPID number.

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Your telephone company gives you the phone number and SPID number after it installs your line.

If your telephone company has the IOC for a SuperStack II bridge/router or boundary router, you do not need to complete step 8.

8 Provide provisioning information that corresponds to your ISDN switch using the tables in the following sections.

This completes the ISDN ordering process for SuperStack II ISDN bridge/routers. Keep the information sheet handy; you will need it when you install your bridge/router.

North American Switch Provisioning Tables

This section provides provisioning information for the following switch types:

- AT&T 5ESS
- AT&T 5ESS Custom
- DMS 100 and National ISDN
- Siemens EWSD

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AT&T 5ESS Switch

To order ISDN service for an AT&T 5ESS switch, provide the telephone company with the information in Table A-1.

Table A-1 Ordering ISDN Service for an AT&T 5ESS Switch

Required Information	Specification
Line type	National ISDN 1 line
Line code	2B1Q (2B+D)
Interface type	S/T interface with NT1 and RJ-45 jack
Maximum terminals (MAXTERM)	1
Maximum B channels (MAXB CHNL)	2
Actual user	Yes
Circuit-switched data	2
Circuit-switched data channel	Any
Terminal type	A-Basic or E-Type (data only) Terminal
Display	No
Circuit-switched data limit	2
Voice or data	Data
Call appearance	Idle
DN (directory number) must be set as follows:	
Parameter	**Setting**
B1	Circuit-switched data
B2	Circuit-switched data
D	Signaling only
MAXTERM	1
MAXB CHNL	2
ACT USR	Y
CSD	2
CSD CHL	Any
TERMTYP	TYPEA or TYPEE
Display	No
CSD Limit	2
CA PREF	1

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AT&T 5ESS Custom Switch

To order ISDN service for an AT&T 5ESS custom switch, provide the telephone company with the information in Table A-2.

Table A-2 Ordering ISDN Service for an AT&T 5ESS Custom Switch

Required Information	Specification
Line type	ISDN line with point-to-point configuration
Line code	2B1Q (2B+D)
Interface type	S/T interface with NT1 and RJ-45 jack
Maximum terminals (MAXTERM)	1
Maximum B channels (MAXB CHNL)	2
Circuit-switched data (CSD)	2
Circuit-switched data channel (CSD CHL)	Any
Terminal type (TERMTYP)	A-Basic or E-Type (data only) Terminal
Display	No
Voice or data	Data
Call appearance preference	Idle
DN must be set as follows:	
Parameter	**Setting**
B1	Circuit-switched data
B2	Circuit-switched data
D	Signaling only
ACT USR	Yes
TERMTYP	TYPEA or TYPEE
CSD Limit	2
CA PREF	1

A point-to-point configuration on a SuperStack II bridge/router or boundary router is selected by setting the SPIDn1 and SPIDn2 parameters to none.

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DMS 100 and National ISDN

To order ISDN service for a DMS 100 or National ISDN switch, provide the telephone company with the information in Table A-3.

Table A-3 Ordering ISDN Service for a DMS 100 Switch

Required Information	Specification
Line type	DMS 100 or National ISDN 1line (in North America)
Line code	2B1Q (2B+D)
Interface type	S/T interface with NT1 and RJ-45 jack
Circuit-switched option	Yes
Bearer Restriction option	No packet mode data (NOPMD)
Protocol	Functional version 0 (PVC 0) for DMS 100
	Functional version 2 (PVC 2) for National ISDN
SPID suffix	1 in North America only
Terminal endpoint identifier (TEI)	Dynamic
Ring	No
Key system (EKTS)	No
Voice or data	Data
DN must be set as follows:	
Parameter	**Setting**
B1	Circuit-switched data
B2	Circuit-switched data
D	Signaling only
MAXTERM	1
MAXB CHNL	2
ACT USR	Y
CSD	2
CSD CHL	Any
Display	No
CSD Limit	2
CA PREF	1

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Siemens EWSD Switch

To order ISDN service for a Siemens EWSD switch, provide the phone company with the information in Table A-3.

Table A-4 Ordering ISDN Service for a Siemens EWSD Switch

Required Information	Specification
Line Type	National ISDN 1 line
Line Code	2B+D
Interface Type	S/T interface with NT1 and RJ-45 jack
Circuit-switched Option	Yes
Bearer Restriction Option	No packet mode data (NOPMD)
Protocol	PPP
SPID suffix	1
Terminal Endpoint Identifier (TEI)	Dynamic
Ring	No
Maximum Keys	64
Key System (EKTS)	No
Voice or Data	Data
Lower Layer Compatibility Option for Data	B channels

SPIDs

When you request services, you may also need the following information about SPIDs and other service attributes:

- Request multipoint, initializing terminal service; the maximum number of terminals is two. The service provider supplies you with two SPIDs.
- If you request ISDN service from an AT&T 5ESS service provider and the switch is running custom (or non-national ISDN 1) software, the format is:

  01 + 7-digit telephone number + 1-digit suffix.
- If you request a different telephone number for each B channel, the suffix can be the same. A suffix of 0 is typical in this case. If you decide to use the same telephone number for both B channels, use a different suffix so that the two SPIDs are unique.
- If you request NI-1 (national ISDN 1) service from an AT&T 5ESS service provider, the format is:

  01 + 7-digit telephone number + 1-digit suffix + 2-digit TID (terminal identifier).

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- The SPID numbers must be unique. The 2-digit TID can be any number from 0 to 62. The TID has no effect on the operation of the SuperStack II bridge/router, but it is a necessary part of the SPID that the bridge/router uses to gain access to the ISDN network.
- If you request ISDN service from a Northern Telecom DMS-100 service provider, the format is:

  Area code + 7-digit telephone number + 0 to 8 digit suffix + 2 digit TID.
- The TID can be any number from 0 to 62, but needs to be unique so that the SPIDs are also unique. This format applies when the switch is running Custom and NI-1 (North American 3) versions of software.
- If you order AT&T 5ESS ISDN services, choose either a Type A or Type E terminal. The Type E terminal is preferable because it is for data only.
- **Do not** request supplementary services, such as autohold or conference, because a SuperStack II bridge/router does not support them.

NT1s and Power Supplies

North American telephone companies require an NT1 and a power supply for every ISDN line. Your service provider or telephone company can provide you with an NT1 and power supply for a small monthly fee. However, you may prefer to purchase it from an ISDN equipment vendor. The NT1 and power supply may come in a single, standalone box or the two may be in separate units. In this discussion, the two units together are referred to as an NT1.

Telephone companies in North America use two kinds of NT1s, differentiated by the data encoding scheme used in transmitting data between the NT1 and the telephone company's equipment. The two data encoding schemes are 2B1Q (two bits mapped into one quaternary symbol) and alternate mark inversion (AMI). The 2B1Q scheme is the dominant method in use today. The AMI scheme is older and rarely used.

Two power sources are available from an NT1 for CPE equipment. An ISDN telephone uses one power source. The SuperStack II bridge/router does not use either source. Instead, it detects the presence or absence of phantom power and can determine whether or not a telephone cord is plugged in.

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Not all NT1s provide phantom power; for example, the AMI NT1 from AT&T does not. If you connect the SuperStack II bridge/router to an NT1 that does not provide phantom power, you must turn off phantom power detection before you can dial successfully. Turn off phantom power detection by setting -PATH PhantomPower to Disable. For more information on this parameter, refer to the software reference guide.

Ordering German ISDN BRI Services

To order German ISDN services for a SuperStack II bridge/router, follow these steps:

1. Acquire a form entitled "Telefondienstauftrag im ISDN (Euro-ISDN-Anschluß)" from the Telekom.
2. At the top of the form, select "Neuanschluß."
3. Under "Auftraggeber," provide the requested information.
4. Under "Anschluß," specify "Basisanschluß als Standardanschluß."

   By specifying "Basisanschluß als Standardanschluß, " you are requesting standard basic rate interface (BRI) service. Under "Anschrift Standort," provide the requested information.
5. Under "Anschlußnutzung," specify "Mehrgeräteanschluß."

   By specifying "Mehrgeräteanschluß," you are requesting a connection for multiple types of equipment, such as bridge/routers, telephones, faxes, and computers.
6. Sign your name at the bottom of the form.

The SuperStack II bridge/router software does not currently support the 1TR6 switch type. If you have an existing 1TR6 connection, request that the connection be changed to a Euro-ISDN connection using this form. In case the Telekom requests this information, the approval number for Germany (Bundesamt Für Zulassungen In Der Telekommunikation) is A115352E.

When ordering ISDN lines in Germany, make sure to order point-to-multipoint ISDN lines. The SuperStack II bridge/router does not support point-to-point configurations when attached to the German ISDN network.

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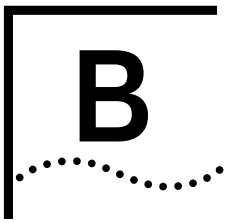

TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, we recommend that you access 3Com Corporation's World Wide Web site as described below.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com Bulletin Board Service (3ComBBS)
- 3ComFacts℠ automated fax service
- 3ComForum on CompuServe® online service

World Wide Web Site

Access the latest networking information on 3Com Corporation's World Wide Web site by entering our URL into your Internet browser:

`http://www.3Com.com/`

This service features the latest information about 3Com solutions and technologies, customer service and support, news about the company, *NetAge*® Magazine, and more.

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

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Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	61 2 9955 2073
Brazil	up to 14400 bps	55 11 547 9666
France	up to 14400 bps	33 1 6986 6954
Germany	up to 28800 bps	4989 62732 188
Hong Kong	up to 14400 bps	852 2537 5608
Italy (fee required)	up to 14400 bps	39 2 27300680
Japan	up to 14400 bps	81 3 3345 7266
Mexico	up to 28800 bps	52 5 520 7853
P. R. of China	up to 14400 bps	86 10 684 92351
Singapore	up to 14400 bps	65 534 5693
Taiwan	up to 14400 bps	886 2 377 5840
U.K.	up to 28800 bps	44 1442 438278
U.S.A.	up to 28800 bps	1 408 980 8204

Access by Digital Modem

ISDN users can dial in to 3ComBBS using a digital modem for fast access up to 56 Kbps. To access 3ComBBS using ISDN, use the following number:

408 654 2703

3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone using one of these international access numbers:

Country	Telephone Number
Hong Kong	852 2537 5610
U.K.	44 1442 438279
U.S.A.	1 408 727 7021

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Local access numbers are available within the following countries:

Country	Telephone Number	Country	Telephone Number
Australia	1800 678 515	Netherlands	06 0228049
Belgium	0800 71279	New Zealand	0800 446 398
Denmark	800 17319	Norway	800 11062
Finland	98 001 4444	Portugal	0505 442 607
France	05 90 81 58	Russia (Moscow only)	956 0815
Germany	0130 81 80 63	Singapore	800 6161 463
Hong Kong	800 933 486	Spain	900 964 445
Italy	1678 99085	Sweden	020 792954
Malaysia	1800 801 777	U.K.	0800 626403

3ComForum on CompuServe Online Service

3ComForum is a CompuServe-based service containing patches, software, drivers, and technical articles about all 3Com products, as well as a messaging section for peer support. To use 3ComForum, you need a CompuServe account.

To use 3ComForum:

1. Log on to CompuServe.
2. Type **`go threecom`**
3. Press [Return] to see the 3ComForum main menu.

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Diagnostic error messages
- A list of system hardware and software, including revision levels
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

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Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

Contact your local 3Com sales office to find your authorized service provider using one of these numbers:

Regional Sales Office	Telephone Number
3Com Corporation	
P.O. Box 58145 5400 Bayfront Plaza Santa Clara, California 95052-8145 U.S.A.	800 NET 3Com *or* 1 408 764 5000 408 764 5001 (fax)
3Com Asia Limited	
Australia	61 2 9937 5000 (Sydney) 61 3 9866 8022 (Melbourne)
China	8610 68492568 (Beijing) 86 21 63740220 Ext 6115 (Shanghai)
Hong Kong	852 2501 1111
India	91 11 644 3974
Indonesia	6221 572 2088
Japan	81 6 536 3303 (Osaka) 81 3 3345 7251 (Tokyo)
Korea	822 2 319 4711
Malaysia	60 3 732 7910
New Zealand	64 9 366 9138
Phillippines	632 892 4476
Singapore	65 538 9368
Taiwan	886 2 377 5850
Thailand	662 231 8151 4
3Com Benelux B.V.	
Belgium	32 2 725 0202
Netherlands	31 30 6029700
3Com Canada	
Calgary	403 265 3266
Montreal	514 683 3266
Ottawa	613 566 7055
Toronto	416 498 3266
Vancouver	604 434 3266
3Com European HQ	49 89 627320
3Com France	33 1 69 86 68 00

Regional Sales Office	Telephone Number
3Com GmbH	
Austria	43 1 513 4323
Czech Republic/Slovak Republic	420 2 21845 800
Germany (Central European HQ)	49 30 34 98790 (Berlin) 49 89 627320 (Munich)
Hungary	36 1 250 83 41
Poland	48 22 6451351
Switzerland	41 31 996 14 14
3Com Ireland	353 1 820 7077
3Com Latin America	
U.S. Headquarters	408 326 2093
Northern Latin America	305 261 3266 (Miami, Florida)
Argentina	541 312 3266
Brazil	55 11 546 0869
Chile	562 633 9242
Colombia	571 629 4110
Mexico	52 5 520 7841/7847
Peru	51 1 221 5399
Venezuela	58 2 953 8122
3Com Mediterraneo	
Italy	39 2 253011 (Milan) 39 6 5279941 (Rome)
Spain	34 1 383 17 00
3Com Middle East	971 4 349049
3Com Nordic AB	
Denmark	45 39 27 85 00
Finland	358 0 435 420 67
Norway	47 22 18 40 03
Sweden	46 8 632 56 00
3Com Russia	007 095 258 09 40
3Com Southern Africa	27 11 807 4397
3Com UK Ltd.	44 131 220 8228 (Edinburgh) 44 161 873 7717 (Manchester) 44 162 889 7000 (Marlow)

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Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain a Return Materials Authorization (RMA) number. Products sent to 3Com without RMA numbers will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S.A. and Canada	1 800 876 3266, option 2	408 764 7120
Latin America	1 408 326 2927	408 764 7120
Europe, South Africa, and Middle East	44 1442 438125	44 1442 435822
Outside Europe, U.S.A., and Canada	1 408 326 2926	1 408 764 7120

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3Com Corporation LIMITED WARRANTY

HARDWARE

3Com warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for the following lengths of time from the date of purchase from 3Com or its Authorized Reseller:

Network adapters	Lifetime
Other hardware products (unless otherwise specified above)	1 year
Spare parts and spares kits	90 days

If a product does not operate as warranted above during the applicable warranty period, 3Com shall, at its option and expense, repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

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3Com warrants that the software programs licensed from it will perform in substantial conformance to the program specifications therefor for a period of ninety (90) days from the date of purchase from 3Com or its Authorized Reseller. 3Com warrants the media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation with respect to this express warranty shall be (at 3Com's discretion) to refund the purchase price paid by Customer for any defective software products, or to replace any defective media with software which substantially conforms to 3Com's applicable published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty or representation that its software products will work in combination with any hardware or applications software products provided by third-parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. For any third-party products listed in the 3Com software product documentation or specifications as being compatible, 3Com will make reasonable efforts to provide compatibility, except where the noncompatibility is caused by a "bug" or defect in the third-party's product.

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